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INTUSSUSCEPTION AND ITS TREATMENT BY HYDROSTATIC PRESSURE: BASED ON AN ANALYSIS OF ONE HUNDRED CONSECUTIVE CASES SO TREATED.[1]

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THE reduction of intussusception by the injection of fluid or air into the bowel is a very old method of treatment. When opening the abdominal cavity was considered an extremely dangerous procedure, it was the only method considered safe; but today, when abdominal operations are undertaken on the slightest pretext, it is generally considered far safer to reduce intussusception by abdominal section than by injections into the bowel, this method being considered uncertain and unscientific. One has only to peruse the literature on the subject to realize the absolute horror that the modern surgeon has of treating these conditions in any other way than by operation.

Mr. E. Owen (*The British Medical Journal*, September 7, 1901) says: "I deem it nothing less than a calamity that physicians have every now and then managed to chase back a bit of bowel by using an enema." He evidently considered that a surgeon would never be guilty of attempting such a thing.

Dr. Clubbe in his book, "The Diagnosis and Treatment of Intussusception," devotes several pages to the method of treatment by irrigation and we must respect the opinion of this eminent authority and pioneer in this work, at any rate in this country. I am proud to have been his pupil for so many years. When I was his house surgeon at Prince Alfred Hospital and at the Old Glebe Children's Hospital over twenty years ago, it was his practice to use injections of olive oil, given with a Higginson's enema syringe, prior to operation in every case and he continued this practice for several years. In his "Notes on Intussusception" which appeared in the *British Journal of Children's Diseases*, July, 1909, he states: "Recently I have altered my method, by omitting the injection

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on May 27, 1926.

and proceeding at once with abdominal section." Some years later, however, he again modified his views and now I understand advises injection by means of an ordinary enema syringe or by a douche holding three hundred cubic centimetres (ten ounces) raised eight feet (Clubbe: "Diagnosis and Treatment of Intussusception," 1921). A height of two hundred and forty centimetres (eight feet) is in my opinion far too high and personally I never exceed a height of a little over a metre (three feet six inches).

Fraser in his book "Surgery of Childhood," published in January, 1926, says that reduction of intussusception by air or water is of historical interest only. There is no need to dwell further on the references in literature to the subject; most authorities are decidedly against attempting to reduce intussusceptions by any kind of injection, fearing that they would succeed in reducing only a few and that more lives would be lost than saved. Some of my colleagues hold that this method would be a dangerous one to teach students, fearing that they would be unsuccessful in most cases and operation therefore would be delayed until the condition was hopeless. They say that the method might be safe in skilled hands, but dangerous when practised by the unskilled. But the same argument applies with equal force to operation. It behoves us, therefore, to try to place the method on a scientific basis and it was with this object in view that I decided to try it systematically on a series of one hundred consecutive cases and analyse the result obtained. The cases were of course not picked, but every case encountered, whether of long or short duration, whether considered favourable or apparently hopeless, has been included in the series.

The result of this investigation, extending over ten years, shows that hydrostatic pressure has not only a decided place in the treatment of intussusception, but that it is absolutely wrong to submit any patient to operation before attempting to reduce the intussusception by injection.

Of the hundred consecutive cases, particulars of which are given later, no less than sixty-two were completely reduced and although in eighteen of these it was considered advisable to make a small opening to confirm the result, the other forty-four were sent from the operating room without operation and in these the signs indicating complete reduction were so evident that in no instance was a mistake made in the diagnosis of complete reduction.

In the earlier cases before sufficient experience had been gained, I operated on patients whom later with added experience I would have been satisfied to leave alone after the injection. Hence out of the fifty-six patients operated on either on account of the uncertainty of reduction or because I was certain that the condition had not been reduced, thirty-one belonged to the first half and twenty-five to the second half of the series.

There was one death amongst the sixty-two patients in whom reduction had been effected by injection. This was an infant ten months old, when the trouble had been present for three days. Death was due to shock and at operation a pinhole perforation was found in the ileum about 2·5 centimetres (one inch) from the ileo-caecal valve. After distending the bowel with saline solution in the manner to be described later, I foolishly in this case contrary to my usual practice palpated the abdomen, whilst it was still distended with fluid, thereby increasing the pressure to a degree impossible to determine and causing the perforation. The condition was a long-standing one and the bowel wall had been damaged to an unusual degree. It is noteworthy that the perforation was in the ileum and not the colon. The accident would certainly not have occurred, if the pressure had been limited to that of a column of water one metre high.

There were four deaths amongst the thirty-eight patients submitted to operation on account of failure to reduce. The duration of the trouble in these cases was forty-six, forty-eight, fifty hours and three and a half days respectively. Resection was done in two of them and in the other two reduction was carried out with great difficulty and only after extensive tearing of the peritoneum.

The mortality in the hundred cases in which injection was tried was 5%. In addition to these hundred cases here reported there were five other patients operated on, but not included in the series, as they were done prior to commencing the systematic attempt at reduction by injection. These all recovered thus bringing the percentage of deaths down to 4·75.

In THE MEDICAL JOURNAL OF AUSTRALIA, November 9, 1918, I reported a series of fifty-one cases of my own, with a mortality of four or roughly 8%. So that there has been a decided improvement in the mortality rate of my own cases since using hydrostatic pressure.

Dr. Vickers in THE MEDICAL JOURNAL OF AUSTRALIA, April 19, 1925, states that the records of the Royal Alexandra Hospital for Children, show that the mortality rate for the last four hundred cases was 14·34%. At least 90% of my cases were done at this hospital and if his figures are correct, they would seem to prove conclusively that many children are lost as a result of the operation alone. One cannot attribute the higher mortality in these four hundred cases to the fact that they include operations done some years ago, as my cases date from 1918. Moreover for some unaccountable reason the mortality increased from 12·7% during the years 1912 to 1914 to 19·0% during the years 1918 to 1920.

The actual mortality, however, important though it is, is only one aspect of the question. The morbidity is infinitely less after reduction by injection and moreover is less, when it is used partially to reduce the intussusception, so that a more favourable incision than the mid-line one can be used. In one hundred and three out of one hundred and five cases I was able to use an incision similar to the McBurney muscle-splitting incision, commonly used for the removal of the appendix, and seldom required to make a larger incision than would just admit two fingers through the peritoneum. I be-

lieve that when a mid-line incision has been made, the omentum would afterwards be found adherent to the scar in the vast majority of cases and when silkworm gut sutures are used to unite the abdominal wall in one layer, the small bowel often becomes adherent also, causing intestinal obstruction soon after the operation or may be many years later.

I believe that the mid-line incision would be found to account for quite a number of the deaths in the cases quoted by Dr. Vickers. I have seen peritonitis follow infection of the wound in these cases and breaking down of the wound with prolapse of the intestines into the bed has frequently followed from the making of a large mid-line incision. I have also seen intestinal obstruction years after the original operation from adhesions of the small bowel to the incision.

Hence I believe that a preliminary trial with hydrostatic pressure, followed by operation through a lateral muscle-splitting incision, is the proper course of procedure in the treatment of intussusception.

Description of the Method.

The result of hydrostatic pressure depends on the way it is used. It is quite impossible to get the same result by using a Higginson syringe for the purpose of the injection, as by using the pressure of a definite column of water. Whether plain warm water or saline solution is used does not matter much, although I prefer the latter.

The height of the head of the column of saline solution must not exceed one hundred and five centimetres (three feet six inches) and in the majority of my cases it did not exceed ninety centimetres (three feet). An ordinary glass douche is quite suitable, but a graduated vessel enables one to watch the progress of the saline solution more closely, as it runs very slowly after portion of the intussusception has been reduced. The injection is given through a No. 15 rubber catheter which is passed into the bowel for seven and a half or ten centimetres (three or four inches) and then the buttocks are pinched closely round it to prevent any escape of the saline solution. It is important not to use vaseline or other lubricant on the catheter, as they make the buttocks so slippery that it is difficult to hold the catheter in. The fluid runs in quickly at first, then more slowly as the intussusception is being reduced and then after a short cessation it may run slowly on again, as the fluid passes into the small bowel and gradually distends it. If the pressure is kept up it may pass right up into the jejunum and in about half a dozen of my cases, probably owing to a reverse peristalsis having

TABLE I.—SHOWING CASES CURED BY HYDROSTATIC PRESSURE ALONE, NO OPERATION BEING PERFORMED.

No.	Date.	Name.	Age.	Sex.	Duration.	Result.	Remarks.
1	November 10, 1918	P.C.	7 months	Female	1 hour	Recovery	
2	January 8, 1919..	J.P.	11 months	Male	9 hours	Recovery	
3	January 11, 1919..	D.P.	4 months	Male	54 hours	Recovery	
4	February 20, 1919	S.W.	10 months	Male	9 hours	Recovery	
5	March 22, 1919 ..	N.R.	2 years	Female	7 hours	Recovery	
6	September 29, 1919	M.H.	16 months	Male	6 hours	Recovery	
7	October 26, 1919..	C.P.	7 months	Male	27 hours	Recovery	
8	June 10, 1920 ..	J.C.	9 months	Female	2 hours	Recovery	
9	November 26, 1920	M.M.	7 months	Female	4 hours	Recovery	
10	February 14, 1921	B.H.	8 months	Male	5 hours	Recovery	
11	April 19, 1921 ..	E.H.	9 months	Female	24 hours	Recovery	
12	August 24, 1921..	H.D.	13 months	Male	11 hours	Recovery	
13	December 10, 1921	E.P.	6 months	Female	4 hours	Recovery	
14	December 19, 1921	R.L.	8 months	Male	6 hours	Recovery	
15	December 26, 1921	M.Q.	3 months	Female	5 hours	Recovery	
16	March 14, 1922 ..	W.N.	9 months	Male	18 hours	Recovery	
17	May 3, 1922	D.H.	8 months	Male	72 hours	Recovery	Mass felt *per rectum*. Child had been treated for gastritis. Second injection returned with bismuth stained motion.
18	July 7, 1922	P.M.	4 months	Female	15 hours	Recovery	
19	February 4, 1923..	V.F.	5 months	Female	10 hours	Recovery	Recurred a week later.
20	February 10, 1923	U.F.	5 months	Female	6 hours	Recovery	Recurred four months later.
21	February 24, 1923	H.S.	5 months	Male	18 hours	Recovery	
22	February 27, 1923	D.W.	11 months	Female	18 hours	Recovery	
23	May 5, 1923	N.B.	9 months	Female	23 hours	Recovery	
24	May 15, 1923 ..	L.K.	10 months	Male	26 hours	Recovery	
25	May 29, 1923 ..	E.S.	8 months	Male	5 hours	Recovery	
26	June 7, 1923 ..	D.R.	6 months	Female	13 hours	Recovery	
27	June 7, 1923 ..	O.N.	7 months	Male	12 hours	Recovery	
28	March 17, 1924 ..	T.R.	5 months	Male	12 hours	Recovery	
29	May 27, 1924 ..	G.S.	6 months	Male	11 hours	Recovery	
30	August 7, 1924 ..	N.G.	12 months	Female	4 hours	Recovery	
31	August 25, 1924 ..	M.H.	11 months	Male	15 hours	Recovery	
32	August 23, 1924 ..	K.S.	16 months	Male	13 hours	Recovery	
33	September 26, 1924	L.M.	7 months	Male	8 hours	Recovery	Operated at three months for same complaint.
34	October 28, 1924..	V.F.	2 years	Female	6 hours	Recovery	Sixth recurrence. Operated for fifth; sixth reduced by injection.
35	December 2, 1924	N.C.	5 months	Female	10 hours	Recovery	
36	January 2, 1925 ..	M.H.	16 months	Male	4 hours	Recovery	Same patient as No. 31.
37	March 24, 1925 ..	J.P.	8 months	Female	15 hours	Recovery	
38	April 21, 1925 ..	R.S.	7 months	Male	3 days	Recovery	
39	May 31, 1925 ..	M.B.	10 months	Female	24 hours	Recovery	
40	July 13, 1925 ..	A.P.	8 months	Male	26 hours	Recovery	
41	January 2, 1926..	R.S.	10 months	Male	60 hours	Recovery	
42	January 12, 1926..	V.J.	5 months	Male	7 hours	Recovery	
43	January 27, 1926..	L.N.	4 months	Male	30 hours	Recovery	Skiagram taken showing barium in small bowel.
44	March 25, 1926 ..	G.M.	6 months	Female	8 hours	Recovery	Skiagram showed barium in small bowel.

been set up, a certain amount passed into the stomach and the child vomited bile-stained fluid freely. On three occasions there has been blood and mucus in the vomit, similar to that washed out from the bowel and on examination of this by the pathologist, *Bacillus coli communis* was shown to be present. Instead of keeping up pressure in this way, however, I generally allow the fluid to return after about two minutes, thus washing out all the blood and mucus from the large bowel. A second injection is then given and sometimes a third, each being held for two or three minutes. Where the intussusception has been reduced by the second or third injection, one usually sees small yellow specks of fæcal material or yellow shreds of mucus in the fluid returned from the bowel. These have come from the bowel above the intussusception, as everything below is either blood stained or of a dark brown colour. At one period I regarded the presence of these canary yellow coloured fæces as almost certain evidence of reduction, but recently I have seen several cases in which this sign was present, and yet there was a small portion of the intussusception unreduced. Although I still regard this sign as an important one, I rely on a far more obvious one to convince me that reduction has been effected, namely the fullness of the abdomen after reduction owing to the passage of the fluid into the small bowel.

In the majority of cases of intussusception one finds the abdomen soft and flaccid, especially whilst the infant is under anæsthesia and the tumour can then be palpated with the greatest ease. After reduction the fluid passes on into the small bowel, no doubt owing to the fact that the ileo-caecal sphincter has been temporarily paralysed on account of having been involved in the trouble. When the fluid is run off from the colon, the small bowel still remains distended and on palpating the abdomen it is quite obvious that it is full of fluid and the contrast between the appearance of the abdomen in this condition and before treatment is very marked. In some cases, however, the fluid does not pass into the small bowel and in these after the saline solution has been run off from the colon, the abdomen again becomes flaccid and one can then feel either the unreduced intussusception or the thickened bowel which remains for some time after the intussusception has been reduced. So that if after the injection it is difficult to palpate a tumour at all, owing to distension of the abdomen, you can be fairly certain that the intussusception has been reduced. If on the other hand a thickening of the bowel can readily be palpated, it may or may not be reduced. The mass resulting from thickened bowel and enlarged glands is softer and narrower than that caused by a small unreduced portion of intussusception which feels quite firm and rounded.

TABLE II.—SHOWING CASES REDUCED BY HYDROSTATIC PRESSURE, BUT OPERATION DONE TO BE SURE THAT REDUCTION WAS COMPLETE.

No.	Date.	Name.	Age.	Sex.	Duration.	Result.	Remarks.
1	September 22, 1918	F.W.	9 months	Male	12 hours	Recovery	
2	October 25, 1918..	P.M.	7 months	Female	9 hours	Recovery	
3	December 11, 1918	H.M.	11 months	Male	17 hours	Recovery	Mass could be felt *per rectum*.
4	July 18, 1919 ..	W.K.	9 months	Male	10 hours	Recovery	
5	April 13, 1920 ..	K.K.	5 months	Male	22 hours	Recovery	Began in ileum twenty centimetres from ileo-caecal valve as shown by appearance of bowel.
6	April 19, 1920 ..	J.H.	6 months	Male	5 hours	Recovery	Operation done six hours after injection, on account of persistent vomiting.
7	October 25, 1920..	J.O.	8 months	Male	3½ days	Recovery	Had been under care of doctor for three days. Bowel was greatly thickened in region where intussusception had been and this caused some doubt as to reduction.
8	January 13, 1921..	J.T.	7 months	Female	18 hours	Recovery	
9	April 16, 1921 ..	E.S.	5 months	Female	17 hours	Recovery	
10	December 10, 1921	W.W.	9 months	Male	10 hours	Recovery	
11	February 24, 1923	B.R.	6 months	Female	21 hours	Recovery	
12	April 4, 1923 ..	F.D.	5 months	Male	33 hours	Recovery	Thickened bowel felt after injection made operation seem advisable.
13	June 4, 1923 ..	A.B.	10 months	Female	3 days	Death	Pinhole perforation of ileum about 2·5 centimetres from valve caused by palpation whilst fluid still in large bowel.
14	June 18, 1923 ..	M.M.	9 months	Female	24 hours	Recovery	
15	February 5, 1924 ..	R.M.	5 years	Male	5 hours	Recovery	Remarkable on account of age. Was sent into hospital as suffering from appendicitis, although mass easily felt.
16	November 6, 1924	L.M.	9 months	Male	4 hours	Recovery	This was a third recurrence and operation was done merely to try to prevent another recurrence. Peritoneum was stripped from appendix and caecum plicated over this stripped peritoneum.
17	December 4, 1924	C.D.	4 months	Male	24 hours	Recovery	Well marked tumour felt before operation, but as no blood had been passed, the patient had been admitted to medical ward. Only a few specks of blood present in the wash out.
18	December 26, 1924	W.P.	12 months	Male	3 hours	Recovery	Abdomen opened as it did not become distended after injection. Evidently the fluid did not pass the ileo-caecal valve.

TABLE III.—SHOWING CASES IN WHICH HYDROSTATIC PRESSURE FAILED TO CAUSE REDUCTION AND OPERATION WAS PERFORMED.

No.	Date.	Name.	Age.	Sex.	Duration.	Type.	Result.	Remarks.
1	October 18, 1918..	W.M.	6 months	Male	24 hours	Enteric ileo-caecal	Recovery	Recurred two months later and again found to be double.
2	November 6, 1918	M.C.	8 months	Male	44 hours	Enteric ileo-caecal	Recovery	Began four inches from ileo-caecal valve.
3	June 25, 1919 ..	H.C.	2¾ years	Male	7 hours	Enteric ileo-caecal	Recovery	
4	September 15, 1919	L.H.	9 months	Male	50 hours	Enteric ileo-caecal	Death	Began in ileum nine inches from valve. Resection and lateral anastomosis.
5	September 30, 1919	W.O.	5 months	Male	12 hours	Ileo-caecal	Recovery	
6	January 5, 1920 ..	A.B.	2 years	Male	6 hours	Ileo-caecal	Recovery	
7	January 11, 1920..	F.W.	6 months	Male	48 hours	Ileo-caecal	Recovery	
8	May 10, 1920 ..	V.R.	4 months	Male	46 hours	Caecal	Recovery	Mass felt *per rectum* before operation.
9	March 21, 1920 ..	L.W.	9 months	Male	16 hours	Ileo-caecal	Recovery	
10	June 12, 1920 ..	D.H.	9 months	Female	41 hours	Ileo-caecal	Recovery	
11	July 10, 1920 ..	V.B.	15 months	Male	88 hours	Enteric ileo-caecal	Recovery	Remarkable on account of having been under care of children's specialist for three days. No blood had been passed. Began in ileum twelve inches from valve. Injection had reduced all but one inch.
12	December 17, 1920	A.T.	4 months	Male	4 hours	Ileo-caecal	Recovery	
13	February 15, 1921	L.P.	9 months	Male	29 hours	Ileo-caecal	Recovery	
14	July 29, 1921 ..	J.S.	9 months	Female	22 hours	Ileo-caecal	Recovery	
15	August 2, 1921 ..	W.C.	7 years	Male	3 weeks	Caecal	Recovery	Diagnosed as appendicitis. Began at base of appendix. Could not be reduced, so *caput-caeci*, with appendix excised.
16	December 19, 1921	A.B.	6 months	Female	24 hours	Enteric ileo-caecal	Recovery	
17	December 27, 1921	B.C.	6 months	Male	23 hours	Caecal	Recovery	Recurred two years later.
18	May 26, 1922 ..	J.M.	7 months	Male	10 hours	Ileo-caecal	Recovery	
19	September 22, 1922	J.G.	8 months	Male	13 hours	Enteric ileo-caecal	Recovery	Began in ileum fifteen inches from valve.
20	January 1, 1923 ..	A.F.	11½ years	Male	7 hours	Enteric	Recovery	Injection not tried in this case.
21	May 11, 1923 ..	B.C.	5 months	Female	10 hours	Ileo-caecal	Recovery	
22	May 13, 1923 ..	B.C.	7 months	Female	15 hours	Ileo-caecal	Recovery	
23	June 14, 1923 ..	S.F.	4 months	Male	28 hours	Ileo-caecal	Recovery	Three injections given in this case, the third two hours after the second, owing to the theatre not being available.
24	May 10, 1924 ..	V.W.	5 months	Female	12 hours	Caecal	Recovery	
25	May 25, 1924 ..	L.M.	3½ months	Male	27 hours	Enteric	Recovery	Began nine inches from valve.
26	January 27, 1924..	A.M.	9 months	Male	12 hours	Enteric ileo-caecal	Recovery	
27	July 15, 1924 ..	A.C.	9 months	Female	4 days	Ileo-caecal	Recovery	Not difficult to reduce. Low pressure used in giving injection on account of long duration.
28	July 19, 1924 ..	C.F.	9 months	Male	9 hours	Ileo-caecal	Recovery	
29	August 26, 1924 ..	W.D.	10 months	Male	10 hours	Ileo-caecal	Recovery	Recurred one month later. Operated on by Dr. Wade. Again an ileo-caecal.
30	October 11, 1924..	H.D.	3 months	Male	3½ days	Ileo-caecal	Death	Resection four hours later.
31	December 6, 1924	J.L.	11 months	Male	5 hours	Ileo-colic	Recovery	
32	December 13, 1924	A.W.	6 months	Male	15 hours	Ileo-caecal	Recovery	
33	April 7, 1925 ..	J.D.	15 months	Female	48 hours	Caecal	Death	Child collapsed under anæsthetic, but recovered sufficiently for operation. Died from shock six hours later.
34	April 17, 1925 ..	L.B.	11 months	Male	6 hours	Ileo-colic	Recovery	
35	July 14, 1925 ..	J.P.	15 months	Male	27 hours	Enteric	Recovery	
36	December 26, 1925	G.H.	9 months	Male	12 hours	Caecal	Recovery	Would certainly have been reduced by a further injection.
37	January 12, 1926..	I.C.	5½ months	Female	9 hours	Ileo-colic	Recovery	About one inch of ileum remained unreduced by injection.
38	March 22, 1926 ..	P.C.	5 months	Female	18 hours	Ileo-caecal	Recovery	X ray taken after reduction showing barium in small bowel.

TABLE IV.—SHOWING CASES IN WHICH REDUCTION BY HYDROSTATIC PRESSURE WAS NOT ATTEMPTED.

No.	Date.	Name.	Age.	Sex.	Duration.	Result.
1 ..	June 24, 1918	C.B.	1¼ years	Male	21 hours	Recovery
2 ..	July 25, 1918	F.F.	7 months	Male	9 hours	Recovery
3 ..	July 30, 1918	R.K.	7 months	Male	54 hours	Recovery
4 ..	August 2, 1921	W.C.	7 years	Male	3 weeks	Recovery
5 ..	February 1, 1923	A.F.	11½ years	Male	7 hours	Recovery

I do not believe, however, in making a fetish of the injection method and if in the slightest doubt, I always make a small opening and make sure.

As the fluid runs into the large bowel, the latter gradually becomes distended and stands out prominently and the contour of the abdominal wall becomes irregular and uneven. After the fluid has passed on into the small bowel, the contour becomes full, even and rounded, no one portion of the bowel standing out more prominently than another.

After complete reduction gas escapes from the catheter and can be demonstrated by holding the end of the catheter under water, whilst the fluid is returning. There is one point worthy of comment during the distension of the abdomen with fluid and that is that the child becomes cyanosed and is apt to make the anæsthetist anxious, but when the fluid is allowed to return and the pressure is taken off the diaphragm, its colour improves again at once.

Latterly I have on several occasions used an opaque injection of starch and barium to see whether it would help in the diagnosis of reduction. I have several plates showing the presence of the barium in the small bowel. The presence of the opaque fluid in the small bowel is more readily seen if the portion in the large bowel is allowed to escape, before the X ray picture is taken. However, I regard this method as cumbersome and apt to waste valuable time. It would, moreover, be of use only in a well equipped hospital and so is not of much practical use to the average practitioner.

I would place the signs to be looked for in the following order:

(i.) The presence of abdominal distension after reduction under anæsthetic, when prior to reduction the abdomen was soft and flaccid.

(ii.) The canary yellow colour of the mucus and specks of fæces in the second and third return after injection.

(iii.) The presence of gas bubbles in the second and third return.

(iv.) Vomiting and escape of bile-stained fluid from the nostrils during the third injection and whilst the child is deeply under the anæsthetic.

(v.) The absence of a definite tumour after injection, when it was easy to feel one before.

I have not included in this series any case in which I could not feel a tumour before treatment, believing that a tumour can be felt in every case generally without, but occasionally only with the aid of an anæsthetic. I mention this fact, because on a number of occasions I have been called to see patients when from the history intussusception was diagnosed, but by the time I saw the patient, sometimes owing to an injection having been given beforehand, no tumour was present at the time. In addition to these there are intussusceptions which undergo spontaneous reduction and others which can be reduced by manipulation without injection. I have, however, omitted all such cases and have included only those in which I could personally vouch for the presence of a tumour, so as to leave no doubt whatever of the diagnosis.

Summary of Cases.

In the whole series of one hundred and five patients there were seventy males and thirty-five females. Out of one hundred consecutive intussusceptions sixty-two were reduced by hydrostatic pressure. In forty-four of these no operation was performed and amongst these cases there were ten in which the duration of the intussusception was over twenty-four hours, three over forty-eight hours and one over three days.

The average duration in these cases was over sixteen hours.

In eighteen out of the sixty-two cases a small incision was made to confirm the diagnosis of reduction. In two of these the duration was over three days, the average being over seventeen hours.

In only thirty-eight out of the hundred cases was there a failure to reduce the infussusception and in these the average duration was 25·8 hours, that is after excluding the case in which the duration was three weeks.

The details of the various cases are set out in the accompanying tables.

DIAGNOSIS OF INTUSSUSCEPTION.[1]

By WILFRED VICKERS, D.S.O., M.B., Ch.M. (Sydney),
Honorary Surgeon, Royal Alexandra Hospital for Children, Camperdown, Sydney.

WHEN I was asked to contribute a paper for this evening I thought it would be a good opportunity to review the cases of intussusception at the Royal Alexandra Hospital for Children. This work was thoroughly done by Dr. Clubbe in 1906 and again in 1921 when he published his series of two hundred and seventy cases. During the past twenty-six years eight hundred and thirty-four patients have been treated with a mortality of 14·5%. In the accompanying table are shown the number of patients treated at the Royal Alexandra Hospital during each year since 1901, together with the results of treatment and the average mortality. I have carefully analysed the histories of three hundred and eighty-five cases since 1917 and my remarks are based principally on the information contained therein. It is my intention to compare these figures with those of Perrin and Lindsay in their monograph based on a series of four hundred consecutive patients admitted to the London Hospital published in *The British Journal of Surgery*, July, 1921. I think the figures will show that the lowered mortality of recent years is due not so much to any special skill in operating or to any special method of treatment, but rather to early diagnosis and if the results compare more than favourably with those published in some other countries, that result is due in a great measure to the influence of the teaching of Dr. Clubbe.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on May 27, 1926.

A Typical History.

The typical history of an acute intussusception reads somewhat as follows:

A.B., male, aged six months, breast fed, was perfectly well until 9 a.m. today when he suddenly screamed and turned pale. He continued to scream and draw up his legs for ten minutes when he passed a small motion. He then became quiet and went to sleep, but woke up about half an hour later and screamed again and vomited. About two hours later he passed some bright blood with mucus, but no fæces, four hours later he passed more blood and mucus. He has cried on and off since the first attack and vomiting has continued at intervals. Between the attacks he has seemed fairly comfortable, but has been rather restless for the past four or five hours.

Examination ten hours after onset reveals a fat, well-nourished baby, weighing 6·7 kilograms (fifteen pounds). He does not look very ill, is somewhat drowsy, his temperature is 36·3° C. (97·4° F.), his pulse rate is 130. His abdomen is not distended, he resists examination and immediately cries and stiffens himself. Under anæsthesia a freely movable mass about ten centimetres (four inches) long can be felt above and to the right of the umbilicus. An injection of saline solution was returned with mucus and bright blood, some old blood, but no fæces.

Now such is a typical history and the majority of patients have these symptoms. In this series 87·5% of the patients gave the history of sudden onset with screaming, turning pale, drawing up the legs and vomiting.

Initial Shock.

The initial shock is usually very severe and the child may look very ill, but these babies frequently recover quickly and may cry only at intervals when they get the griping pains as the intussusception is forced along the bowel. Between the attacks of pain the child may seem very comfortable and look so well that it is difficult to believe that he has intestinal obstruction. But we must not be put off by the appearance of the child. On this history of sudden onset intussusceptions are frequently diagnosed and the patients are sent into hospital before blood has been passed *per rectum*. The mother's history is very important and should be carefully listened to.

Passage of Blood Per Rectum.

Passage of blood *per rectum* should not be considered an early sign. It does occur early, but in many cases it is delayed twelve, twenty-four or thirty-six hours. The average time at which blood appeared in this series was 7·2 hours after onset. In 11% of the cases no blood was passed and in 27% of the cases blood did not appear until an enema was given.

In 11% no blood appeared; in 17% no blood appeared in the first hour; in 17% blood appeared between one and four hours; in 25% blood appeared between four and eight hours; in 10% blood appeared between eight and twelve hours; in 10% blood appeared between twelve and eighteen hours; in 6% blood appeared between eighteen and twenty-four hours; in 4% blood appeared after twenty-four hours. So that while blood is usually an early sign, appearing in the first four hours in one-third of all cases, in many it is a late sign, appearing in 20% after twelve hours. These figures also show the diagnostic value of a saline solution wash-out as in 27% of the cases blood was not passed until this had been given. Blood passed in the first few hours is usually bright, but later both old and recent blood may be passed. As a rule mucus is passed with the blood.

Passage of Fæces.

The passage of fæces after the onset was investigated. In 61% of the cases no fæces were passed after the onset. In 13% a motion containing fæces was passed in the first two hours.

In 6·5% a motion was passed between two and four hours; in 8·5% a motion was passed between four and eight hours; in 5·2% a motion was passed between eight and twelve hours; in 2·8% a motion was passed between twelve and eighteen hours; in 3·0% a motion was passed after eighteen hours.

It will be seen from the above figures that the passage of fæces cannot be taken to mean that there is no obstruction. It is usually, of course, due to the emptying of the bowel below the obstruction, though in a few cases it indicates that the obstruction is not complete.

The Tumour.

In the vast majority of cases of intussusception a mass in the abdomen will be found. If the abdomen is soft and flaccid the tumour is not very tender and will be easily felt or if the condition is of forty-eight hours' duration, the mass may be so large as to be visible as a swelling in the left iliac fossa. Frequently an anæsthetic will be necessary. The abdomen should be carefully palpated with the fingers following the line of the colon from the caecum. Then the child should be examined bimanually with one hand in the loin and after that with one finger in the rectum. Frequently the mass is not sausage-shaped but is more rounded. It will often be felt to harden with each spasm of pain and then become soft when the spasm has passed. If it is small and tucked up under the liver, it might be difficult to find, but systematic search usually locates it. In a baby the edge of the liver can usually be palpated one or two fingers' breadths below the costal margin and may easily be mistaken for an intussusception. The fact that it is not freely movable and has a sharp edge should prevent this error. If the mass is more than a couple of inches long it is usually curved with the concavity towards the umbilicus. If the tumour is in the transverse colon it is generally low in the abdomen. In early cases the mass will mostly be found in the right side, in late cases in the left side. It can be felt in the rectum as a rule only in the late cases. In this series this observation was recorded only seven times. Five of these patients died. If there is much distension, the mass may be difficult to find even with an anæsthetic. The mass is usually freely movable. This assists to distinguish it from mesenteric glands and also from the engorged colon sometimes found in colitis or Henoch's purpura. Another sign sometimes referred to is the emptiness of the right iliac fossa. We have not found this of much value, though sometimes it is pronounced.

Dr. Clubbe states in his book that he remembers only two cases of intussusception in which he opened the abdomen without first feeling the mass.

Differential Diagnosis.

In *The British Journal of Surgery* of July, 1913, under the heading of "Instructive Mistakes" the first two cases are: "Acid Intoxication Mistaken for Intussusception" and "Intussusception Mistaken for Infantile Enteritis."

The history of the first case is as follows:

D.B., aged five years, a bright fat healthy girl, was taken with what appeared to be a "bilious attack." The bowels were opened with a mild purgative and mucus was passed. She was restless and uncomfortable, but had no definite pain or tenderness. The vomiting continued with no special relation to food. Mucus continued to be passed by the rectum, but no blood or fæces for three days. The child was examined by an eminent physician and later by a surgeon. An elongated resistance could be felt below the right costal margin which we thought to be an intussusception. At operation nothing abnormal was found except that the liver was large and fatty. The urine was now examined for the first time for acetone and diacetic acid and gave the reaction for both. A complete autopsy revealed no organic disease of any sort and so the diagnosis of acid intoxication was made.

The writer comments as follows:

After the event it was easy to see that the combination of drowsiness and vomiting with sweet-smelling breath ought to have led to the suspicion of acid intoxication, which could easily have been confirmed by the examination of the urine for acetone bodies. But at the time, unfortunately, this idea did not present itself and the vomiting, passage of mucus by the rectum, abdominal fullness and elongated swelling all suggested the diagnosis of intussusception. The absence of colicky pain ought, however, to have given us warning, and it did indeed make us think that the case was unusual.

It is obvious that the deciding factor was the presence of the elongated tumour and again I would emphasize the point that even a normal liver in a baby might be mistaken for an intussusception.

The second case, "Intussusception Mistaken for One of Infantile Enteritis," is an instance of a more common mistake, for scarcely a year passes without our having at least one such case at the Royal Alexandra Hospital for Children.

W.S., aged ten months, was admitted on August 1 for diarrhœa and vomiting. On admission the child was rather collapsed and blue. Temperature 97° F., pulse 130. The child was constantly crying as if in pain. Motions, three or four each day, were greenish with a little blood and mucus. Vomiting occurred after each feed. A provisional diagnosis of gastro-enteritis was made. For six days the condition remained much the same, the stools continued to be loose and contained both mucus and blood, but were never more frequent than four each day. On the sixth day the abdomen became distended and a rather indefinite resistance was felt above the umbilicus. At operation an ileocolic type of intussusception was found, the apex of the intussusception being in the upper part of the descending colon. A reduction was easily effected. The operation was completed by performing an appendicostomy, by means of this continuous saline was administered. The baby died twelve hours later.

The writer comments as follows:

There can be no doubt that if the nature of the case had been recognized when the child was just admitted it would have had a very good prospect of recovery. Even after five days and in spite of drugs and purgatives the invagination of the bowel was readily reducible. The fact that the abdomen showed neither distension nor tumour during the first four days was due to the fact that complete obstruction did not exist. The principal feature which might have prevented the mistake, was the scanty nature of the stools. In a case of gastro-enteritis the motions are usually much more numerous than four a day. In this case although they were only few in number each stool contained both blood and mucus. Enteritis on the other hand rarely causes blood in the stools unless the diarrhœa is very severe.

If the author's view is correct and an intussusception existed from the beginning without causing complete obstruction, then an examination under an anæsthetic would almost certainly have revealed a tumour earlier. But it would be extremely unlikely that an ileo-colic intussusception would exist for six days and then be easy to reduce.

It is in these cases of colitis that the greatest difficulty of diagnosis arises. The onset in both may be sudden, but as a rule the obstruction in intussusception is complete in a few hours and a rectal injection returns only blood and mucus and no fæces, whereas colitis is characterized by frequent blood-stained motions in all of which some fæces appear. The colon, hardened from inflammation, may be felt, but it is usually much less definite and can never be felt as a mass in the rectum. In this series thirteen patients gave a history of diarrhœa and vomiting existing at the time of onset and of these four died. In at least three of these thirteen cases the condition had been missed for hours owing to the previous diagnosis of gastro-enteritis or colitis.

Prolapse of the Rectum.

It occasionally happens that the diagnosis has to be made from prolapse of the rectum; one such case occurred in this series.

A baby, ten months old, was noticed to be fretful and vomited. About forty-eight hours later the mother noticed that there was something projecting from the anus. She went to a doctor who diagnosed a prolapse of the rectum and told the mother to push it back. The child had several small motions each day without blood and two days later was taken to another doctor who gave the same advice. On the sixth day blood was passed *per rectum* and for the next twenty-four hours no fæces were passed. On the seventh day the child was taken to another doctor who felt a mass in the abdomen and sent the child into hospital. An intussusception was found commencing at the *caput caeci*. The invagination was found and reduced without much difficulty and the child recovered.

The mistake should not occur, because in a true prolapse there is no interval into which the fingers can be inserted, while in intussusception the examining finger can be swept completely round the prolapse.

Henoch's Purpura.

Henoch's purpura is characterized by vomiting, abdominal pain, tenesmus and passage of blood and mucus and later swelling of joints and presence of purpuric spots. The main points of difference are: The patient is usually six or seven years of age, there is never a true intestinal obstruction, no mass can be felt *per rectum*, but there is usually an

œdematous feeling of the rectal mucosa and sometimes a fixed tumour in the left iliac fossa which is really an infiltration of the coats of the intestine with hæmorrhage, later purpuric spots appear. At the same time it must be remembered that there are two cases on record in which intussusception has occurred in a case of Henoch's purpura.

Summary.

(i.) Most acute intussusceptions, 63% in this series, occur between the ages of five and nine months in fat well-nourished babies.

(ii.) Males predominate in the proportion of 61 to 39.

(iii.) A history of sudden onset was obtained in 87·5%.

(iv.) In 89% blood is passed by the bowel, the average time being 7·2 hours after the onset. In twenty of the cases blood is not passed until after twelve hours.

(v.) Fæces may be present in the motion hours after the onset, in 10% after eight hours.

(vi.) Every baby, giving a history of a sudden attack of screaming with pallor, should be carefully examined for a mass and should be given a rectal wash out for any evidence of recent or old blood.

(vii.) Blood should be looked upon as a relatively late sign.

(viii.) The finding of a mass *per rectum* should be looked upon as a very late sign.

(ix.) Care must be taken not to mistake the lower edge of the liver for an intussusception.

(x.) All patients having a history of small motions, three or four a day, with blood and mucus, should be carefully examined for a mass.

(xi.) The average number of hours' duration before operation in this series was 18·5.

(xii.) The average number of hours' duration before operation in the patients that died, was forty-four.

(xiii.) Although twice as many males are attacked as females, it would seem that females are less resistant, as 51% of the deaths occurred in females and 49% in males.

(xiv.) Breast feeding was recorded in 33% of the cases, only 5% being noted as artificially fed. No note of the feeding was made in the remainder. The inference is that probably a very large percentage is breast fed.

Conclusion.

Some interesting information can be obtained from a study of the months of the year in which the cases occur. It will be seen that the highest numbers occur in December and May. The average of the summer months is thirty-one and of the winter months twenty-eight. A glance at the London figures shows that the highest numbers are recorded in December and April. It would seem that gastro-enteric infections have very little to do with the causation. Probably the explanation is that many of the cases occur round the time of the festive season when indiscretion in diet is liable to occur.

Dr. Hipsley has quoted his figures in comparison with the average mortality at the Royal Alexandra Hospital for Children, Sydney, and has concluded that his method has been responsible for the reduction to 5% shown in his series. That there is another factor is shown by the fact that Dr. Clubbe has a continuous series of one hundred cases, almost all treated by laparotomy, with only a 7% mortality while his next fifty cases showed a mortality of 20% and included eight resections. My own series of seventy-five cases since 1918, almost all treated by laparotomy, shows a mortality of 6·6%. In 1922, in forty-eight cases the average was 6·2% and the average for the three years 1908 to 1909 and 1910 was 8·2%.

TABLE SHOWING CASES OF INTUSSUSCEPTION TREATED AT THE ROYAL ALEXANDRA HOSPITAL FOR CHILDREN SINCE 1901.

Year.	Total Cases.	Cured.	Died.	Percentage Mortality.
1901	10	6	4	40·0
1902	16	11	5	31·2
1903	17	14	3	16·5
1904	19	14	5	21·0
1905	21	16	5	24·0
1906	18	15	3	16·2
1907	25	19	6	24·0
1908	31	30	1	3·2
1909	44	39	5	11·3
1910	30	28	2	6·6
1911	24	17	7	29·1
1912	32	28	4	12·5
1913	31	27	4	13·0
1914	24	21	3	12·5
1915	49	39	10	20·4
1916	28	23	5	17·1
1917	39	33	6	15·3
1918	43	38	5	11·6
1919	34	23	11	32·3
1920	36	31	5	13·9
1921	46	44	2	4·3
1922	48	45	3	6·2
1923	54	48	6	11·1
1924	72	65	7	9·8
1925	43	39	4	9·3
TOTAL ..	834	713	121	14·5

Acknowledgment.

I wish to record my thanks to my colleagues at the Royal Alexandra Hospital for Children for permission to use the histories of their patients.

EARLY DIAGNOSIS OF GASTRIC CANCER.[1]

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I AM sensible of and appreciate the compliment you have paid me in asking me to deliver this address on a subject which, needless to say, is one of the most important and urgent problems of the present day before the medical profession.

Authors of textbooks and monographs write dogmatically of carcinoma of the stomach and describe definite and constant clinical syndromes and indicate infallible signs and tests, as for example

[1] Read at a meeting of the Section of Surgery of the New South Wales Branch of the British Medical Association on April 28, 1926.

the invariable absence of hydrochloric acid or the adventitious presence of lactic acid in the test meal or the presence of occult blood in the fæces whereby carcinoma of the stomach should be diagnosed without fail.

After reading these very literary and pleasant articles, how easy a diagnosis appears, but it is surprising on comparing them with one's own surgical experience in which the diagnostic side has been even more an interest than the operative, how extraordinarily difficult and unlike the book the actual problem really is and how many unexpected phases it presents in practice. Certainly in 65% to 70% of cases the signs and symptoms as generally laid down hold, but in the remaining 30% to 35% they serve only to mislead. The well recognized symptoms and signs are usually of academic interest only, for they are based on a middle or late, probably inoperable, stage of disease. We should pay much more attention to the early manifestations, for only by the study of these can we hope to improve our early diagnosis of cancer of the stomach and thus its treatment.

It is my intention in this paper to deal with the early phases only of gastric cancer and to base my remarks on a review of the histories of all the patients with carcinoma of the stomach who have come under my notice.

In making a diagnosis there is no doubt that we moderns are inclined to rely too little on our reasoning powers and too much on the wonderful modern clinical aids, the laboratory tests and the X ray examinations, whereas, if we could again cultivate with these wonderful modern helps the almost uncanny, reasoning powers which our forefathers brought to bear on the simple story of the patient, we should indeed improve our early diagnostic capabilities in this protean disease.

Perhaps the not uncommon custom of relying on the X ray specialist and the laboratory pathologist for the major solution of the diagnosis is responsible for the many poor and loose diagnoses which are so cruel. The X ray man also has his troubles. He has little opportunity of becoming thoroughly conversant with the clinical history, as the clinician infrequently holds a consultation or forwards a full history. He also has very little opportunity of following up his cases and getting a proper perspective. Guided by clues from clinical histories which directed particular attention to a certain part of the stomach, I have seen many an X ray diagnosis of absence of carcinoma of the stomach changed to one of its presence by a surgeon's inspection of the radiographer's photograph. For example an indefinite resistance, an ill defined or even a well defined tumour may correspond to a suspicious filling defect or an indefinite deformation of stomach contour.

Difficulties of Early Diagnosis of Gastric Carcinoma.

The diagnosis of carcinoma of the stomach is most difficult for many reasons, but mainly because the disease presents so many confusing aspects, is often well established before symptoms become manifest and is ushered in by a variety of types of onset which mislead the diagnostician and lead to a confusion with other diseases.

The mode of onset, the course, the symptoms, signs and even chemical tests and X ray criteria vary widely, according to the situation of the growth, that is whether it is located at the pylorus or on the gastric canal, the body of the stomach or close to the cardiac orifice. They also depend on the nature of the growth, that is on the virility of growth of the cancer cell in relation to the body's natural immunity to cancer which determines whether the carcinoma infiltrates widely the wall of the stomach or grows locally and fungates and ulcerates. Probably a poor cell and a good resistance produces the former and the reverse the latter type.

Though the characteristic onset in 70% of cases is a gradual, progressive, mildly painful, dyspepsia originating *de novo* midway in the course of the disease, yet it may be a dyspepsia so severe and so related to food that it simulates gastric or duodenal ulcer or in contrast to this there may be a long silent interval with perhaps only toxic symptoms as loss of energy, anorexia, anæmia, perhaps with a tumour and more often without. Very rarely an onset with anæmia and diarrhœa alternating with constipation may simulate a colonic carcinoma.

More often it begins with nausea and copious vomiting, an almost painless dyspepsia when the pylorus is first affected or with a dysphagia when the cardiac end is affected. Only in two patients (1%) of my series did carcinoma supervene on ulcer.

With the exception of the first mentioned all these onsets are anomalous and, though they represented only a minority of cases, yet they are most important in early diagnosis, for in a study of about three hundred of my case histories it was among these that I found most of the mistakes in early diagnosis and tragedies in treatment. Hence it has occurred to me that if I directed attention to these irregular onsets and attempted to explain them with the physiological knowledge at my command, it might serve to improve my own and your early diagnosis of gastric carcinoma.

Another difficulty in early diagnosis of a malignant stomach is that the patient often reports late in gastric cancer, especially when he suffers from that cellular form of growth in which constitutional rather than local symptoms predominate, when the patient is utterly unaware of the tragic significance of his mild dyspeptic symptoms.

That education of the public in health matters of this sort is wise and would save many lives is well exemplified by a comparison of the results of operation in our public and private cases. In the former because of financial reasons, want of intelligence and education the patients presented themselves late in the course of the disease and I can number very few successes of over three or four years, whereas in the latter the private patients who were probably on a higher financial, intellectual or educational plane, sought relief much earlier and among these I have a great many more successes even up to five, six and seven years. Indeed, one patient, done seven

years ago, recently wrote to me to say he had been insured as a first-class life.

The Rationale of Local Symptoms, Pain and Vomiting.

Fullness, discomfort, pain, with more or less nausea and vomiting are the most constant and consistent and we need a physiological understanding in order to appreciate the significance of the various symptomatic patterns which are formed from variations of these features.

The stomach is innervated from the ninth, tenth and eleventh segment so that pain is referred to the epigastrium, the area representing the sensory distribution of these segments and, as the afferent receptors of the stomach are not represented in the cerebral cortex, a stimulus anywhere in the stomach is referred to the epigastrium so that the site of a pain is not a clue to the part of the stomach affected. Yet it is not uncommon for patients to point to left hypochondrium as the seat of their pain. In these cases probably the lesion has extended beyond the stomach.

As you know, the stomach can be handled in operations under local anæsthesia without any resulting pain, though as happens in all the viscera, dragging on or crushing the stomach will cause discomfort, pain, sickness and vomiting. For example, I crushed the base of a slightly inflamed appendix in a conscious woman; she immediately complained of epigastric pain, felt sick and vomited. There are, therefore, no sensory fibres in the stomach; it does not need them; it is provided with receptors only to indicate the tension or fullness of the stomach, a conservative reflex of Nature.

Mild stimulation of these receptors causes fullness, while greater degrees cause discomfort and finally pain. Nausea and vomiting are also manifestations of irritation or stimulation of the afferent tensor receptors in the stomach.

Abnormal stimulation of these tension receptors can occur: (i.) In the gastric wall from inflammatory or malignant infiltration; (ii.) by increased tension in the gastric lumen which of course could be caused by some affection of the gastric wall such as carcinoma. This would interfere with the neuromuscular mechanism governing the orderly relaxation which normally enables the stomach to accommodate itself to its different loads and quantities and to maintain a constant intragastric tension.

Probably because it represents the original intestinal tube and is better supplied with tension receptors and has more to do with peristalsis than the rest of the stomach, a lesion on the gastric canal in my experience is more painful than one in the body of the stomach.

Pain in gastric cancer is caused probably along these lines and it should, therefore, follow that the more widely permeation and infiltration invade the gastric wall, the more pain should be a feature and, conversely, the more fungating and local the growth, the less should be the pain. As a matter of fact this, I find, is more or less true in practice, so much so that, as I will try to show later, some of the more or less widely infiltrating tubercular, flat, creeping, cartilaginous types of carcinoma of the stomach, especially if they involve the lesser curvature, are almost clinically indistinguishable from gastric or duodenal ulcer, while the local, cellular, fungating kinds are sometimes so free from pain as to be mistaken for pernicious anæmia or Addison's disease *et cetera*.

The former type of cancer from the much wider affection of tension receptors should be more associated with sickness and nausea than the latter and this is really so, though sickness and nausea are characteristically present in all forms of cancer, a striking contrast to ulcer which one would expect because of the much wider affection of tension receptors.

It would also follow that the sequential occurrence of fullness, discomfort, pain, over a period of a month or two was an indication of a progressive lesion, that is a carcinoma in the gastric wall. Indeed, one of the points that our own case history review brings out, is that the sequence of these symptoms is of considerable diagnostic value.

It is a curious and well known fact that great distension of the gall bladder or kidney from a stone impacted in the cystic duct or ureter can sometimes occur almost without pain. If the tension is produced slowly enough the stones can, as it were, become "tolerated." Perhaps it is on this property of hollow viscera or perhaps from the usually very small segment of the infiltrated gastric wall that pyloric carcinoma with immense dilatation of the stomach developes so insidiously and painlessly in so many patients some of whose histories I intend to show you later. These patients report early for sickness and vomiting from mechanical obstruction of pylorus and much more frequently than they do for a painful dyspepsia.

The Rationale of General Symptoms.

The general symptoms, rapid and inexplainable loss of mental and physical energy with progressive anæmia without ascertainable cause, are due to the intensely toxic effect of the cancer metabolites and to sepsis, ulceration and occult bleeding. Apparently the cancer metabolites have both a specific hæmolytic effect and a general toxic action on tissue cells.

Malignant toxin appears to be developed in proportion to the cellularity of the growth. This toxin, besides its hæmolytic and metabolic effects, seems also to act as a capillary wall poison, judging from incisions into the tissues which generally show capillary stasis. This probably affords an explanation of the low blood pressure which is found even early in the disease. In my cases the average age was fifty-six and the average blood pressure 120 and this low blood pressure with the other effects of the toxin probably accounts for the curious loss of mental and physical energy which occurs early, too early to be due to any nutritive loss and also for the specific loss of weight and it affords an explanation of why in these patients gastric and abdominal

wounds heal so badly and why, feeling fairly well after operations, they die so placidly.

From a consideration of these physiological and pathological factors it will be evident why so many types of clinical history can be given by patients.

Clinical Types of Carcinoma.

In the following case a characteristic onset is seen:

T.H., aged forty-five years, felt perfectly well till ten months ago, then he developed indigestion and fullness which, notwithstanding some treatment, soon became discomfort developing into mild pain coming on immediately, but worse about one hour after meals. This pain would last from one to two hours and was not relieved by anything. The pain was worse after a heavy meal and coarse food. He has had a lot of nausea, but no vomiting. Has required more and more medicine to keep his bowels regular. Since eight months ago he has gradually lost his appetite. At first he had a disinclination for meat; he has been unable to do his office work for the last three months and feels depressed. He looks waxy and has become very pale and keeps on losing weight. No tumour was palpable. A radiologist reported a pathological condition involving the *pars pylorica* causing deformation of the latter with gastric hypoperistalsis and relative slowness of emptying, probably due to an extrinsic cause such as gall bladder.

This history represents the characteristic and constant onset of gastric carcinoma in 70% of our patients.

The onset in malignant stomach is almost sudden and nearly always in a patient previously free from indigestion so that as a rule it is distinctly appreciable.

A surgeon who developed carcinoma, told me that discomfort, amounting almost to pain, after a rather sumptuous British Medical Association dinner was the first symptom of his carcinoma which came on ten months before he, a surgeon, sought surgical advice. His discomfort and pain reappeared occasionally for the next two months, but by taking small meals he managed to keep himself comfortable till finally the discomfort and pain, now associated with much sickness, became constant.

A bishop, who should be a good observer, suffering from early prepyloric carcinoma told me that his very first symptom for a month was a disinclination for meat. Discomfort and sickness then developed. Here again there was nothing abnormal found on X ray examination, a suspicious prepyloric deformation being explained by extrinsic gastric causes (gall bladder).

It is singular how free these patients were from previous dyspepsia. In fact, a *de novo* onset was the universal rule and was of distinct diagnostic importance. All my patients in whom a previous definite ulcer history could be established but who had recently developed the clinical appearance of gastric carcinoma, could have been regarded as free from cancer on the ulcer diagnosis. The lesion was invariably some sequel of ulcer as in the following interesting and instructive case history in which the diagnosis was carcinoma developing on old ulcer.

A.R., aged fifty-eight years, had a seven years' history. She would be well for three or four months and ill for about the same time.

Ulcer symptoms began with sourness, wind, severe burning pain one to two hours after food which was worse after certain coarse food such as meat *et cetera*. She would vomit and get great relief. She was not very constipated and had not lost weight.

Onset of pyloric stenosis occurred nine months ago when she got very much worse but no longer had pain, she lost her appetite and became very constipated. She lost 15·7 kilograms (two and a half stone) weight in nine months. Every day for the last six months she has vomited usually at 9 p.m. a large quantity. She looks ill, cachectic and appears to be suffering from malignant disease. She has no tender spots.

At operation prepyloric ulcer which had healed with definite stenosis was found. There was no malignant disease.

This is also the picture of carcinoma developing on an old ulcer and I would ask you to compare this with the following history of one of three patients, still alive after six years, in whom carcinoma at least clinically appeared to develope on an ulcer.

The Carcinoma Developing on Gastric Ulcer Onset.

A.F., aged forty-six years, had complained for twenty years of "stomach trouble" of pain and vomiting after food. The illness had changed during the previous two years and especially during the previous six months. He had lost 6·3 kilograms (one stone) weight in the previous two months. He had pain two hours after food. He vomited nine hours after food and obtained relief when he vomited. He looked ill and cachectic. No tumour was palpable. At operation a carcinoma developing on old prepyloric ulcer was found. Even when the ulcer was removed, the microscopical diagnosis was difficult. This patient is still alive after six years.

There were only three patients in whom, judged from the clinical standpoint, the carcinoma seemed to have developed on an ulcer, yet even in one of these the carcinoma was on the greater curvature, a most unusual site for ulcer and in addition to this a very suspicious duodenal scar might afford explanation of the ulcer symptoms, but undoubtedly the remaining two had definitely developed on old ulcers.

There were only 15% in our series with a previous gastric history and these were apparently functional. It almost appears, as McLean observes, that a previous dyspepsia saves the stomach from a dietetic abuse which probably predisposes to carcinoma.

Clinically, therefore, careful analysis of my histories gives no support at all to the view, formed on histological grounds, that carcinoma arises on old ulcer. It is interesting to note in relation to this that a reinvestigation by Dibbles (*British Journal of Surgery*, XII., 666, 1925) along histological lines disproves the fallacy that carcinoma arises on an ulcer scar in a majority of cases.

"The Silent" Interval.

When I compared the duration of the patient's complaint to the apparent age of the tumour found at operation, it was perfectly obvious that there was on the average an interval of four or five months almost quite free from symptoms.

An attempt to probe this "silent" interval for symptoms in a number of cases elicited very little that was helpful in diagnosis. In my experience the usual story of this interval was often as follows:

A man, most apologetic for wasting my time, has been cajoled by his wife into the consultation: "Never sick a day in his life"; "Doctors would starve if they depended on him"; "Has been told by his wife and family and friends that he has not been looking well"; "Is a changed man"; "Has gone off in his golf, has lost interest in his office and the pleasure of his pipe and missed his regular morning visit to the lavatory, the latter an unprecedented occurrence and for the first time in his life has become conscious

that he has a stomach." "He has no periods of respite but is bothered all day and every day by slight gastric troubles accentuated by food." "This dyspepsia," he says, "has gradually got worse notwithstanding the fact that he has had home remedies and family physician's treatment."

Even when the growth is well established there is often only a mildly painful, progressive dyspepsia associated with a considerable amount of nausea.

Pain, the study of which is of the greatest importance in clinical diagnosis of gastric carcinoma is as a rule never absent and is worse immediately or at a variable time interval after food. In ulcer, on the other hand, pain with an indefinite relation to food is unusual, while pain immediately after a meal is rare. The great sense of relief which follows vomiting in ulcer, is almost absent or at least not nearly so distinct as in ulcer.

Fullness, soon becoming discomfort and gradually developing into pain, indicates a progressive lesion of the gastric wall and at once suggests carcinoma. It is not an uncommon syndrome, but generally only elicited by cross examination.

The association of pain with a lot of sickness and nausea is most characteristic of a malignant stomach.

The unremitting, relentless progress of all these symptoms is most important evidence of carcinoma, though I am convinced that the early diagnosis of many a case of cancer of the stomach is overlooked, because it is not recognized that distinct improvement and even increase in weight from treatment and rest in bed can occur in carcinoma patients.

The "Gastric Ulcer" Onset.

While, as previously mentioned, the moderate, painful dyspepsia with considerable nausea and sickness is the common onset, yet in many patients severe pain with a very definite relation to food was such a predominant symptom that their condition was diagnosed even by experienced practitioners as gastric ulcer and even as duodenal ulcer. Usually, but not in all cases, we found that the pathological basis in these patients was a widespreading, creeping, permeating, often colloid, cartilaginous carcinoma with very little tendency to produce metastasis. It always involved the lesser curvature and therefore the gastric canal.

Infiltration of the gastric canal by this cartilaginous type of growth is probably responsible for the unusual pain. For purposes of diagnosis we may regard the gastric canal as the original intestinal tube or canal and the rest of the stomach as a sort of diverticulum of this and probably, therefore, much less richly supplied with nerve fibres and much less intimately associated with the origin of peristaltic movement than the gastric canal. Perhaps this is the explanation of my observation that carcinoma may be more painful here than in the rest of the stomach and that growth in this situation is mistaken for ulcer. When I tell you that many of these patients were treated as though they were suffering from gastric ulcer even for a period of twelve months, till when the disease was recognized it was too late for operation, you will appreciate the importance of keeping this mode of onset in mind.

The following case is a tragic example of this and the patient was treated with very little justification as suffering from gastric ulcer for twelve months, yet even then an apparently satisfactory partial gastrectomy was possible. The ultimate result, however, would have been very different, if it had been done when symptoms had definitely appeared twelve months earlier.

S.K., aged fifty years, gave a history of having been ill for eighteen months. His illness commenced with pain and fullness in the epigastrium four hours after meals, relieved by alkalis or belching. Six months later he began to vomit and this also relieved the pain. The vomiting became daily during the last three months and occurred four to six hours after food. Note, the vomiting was progressive in its degree. During the last twelve months he was unable to work and had lost 12·6 kilograms (two stone) in weight. He had always been constipated, but had to take a great deal more medicine latterly. General epigastric rigidity was present but no tender spot. No tumour could be felt. Blood pressure (systolic) was 100 millimetres of mercury. The operative finding was carcinoma extensively infiltrating the lesser curvature.

The Duodenal Ulcer Onset.

The duodenal ulcer onset occurs only occasionally. Here is the history of a patient in whom a more cartilaginous and wider infiltration, as well as affecting the gastric canal, spread like a serviette ring over the adjoining stomach.

The patient's condition was with some justification diagnosed and treated for a while as duodenal ulcer.

T.R., aged thirty-seven years, was ill for nine months. He complained of pain three hours after food, at 12, at 5 and at 10 o'clock at night. He obtained great relief on taking food and had some relief on taking alkali. He lost 6·3 kilograms (one stone) of weight. General epigastric rigidity was present but no tender spot. All the symptoms had steadily progressed without any respite.

Here are three clinical clues suggesting carcinoma: The absence of a deep tender point, the progressive and non-periodic history and the distinct loss of weight. These created a suspicion of carcinoma and a skiagram taken by Dr. Pearce which I show you, revealed the correct diagnosis of gastric carcinoma. The skiagram will convey to you an impression of the widespread character and position of the growth.

When this cartilaginous, infiltrating type of carcinoma occurs in young people, as it often does, the confusion with ulcer is even greater. I could quote five cases to support this statement but two striking and instructive examples will suffice:

K.N., aged twenty-seven years, had been ill for nine months and had gradually got worse. He had been a heavy spirit drinker since childhood. He complained of severe, nagging pain in the epigastrium to the left of the midline immediately after food and worse an hour afterwards. The pain was present at all times but worse after taking food. It woke him up in the middle of the night. He vomited a good deal, not always in relation to taking of food. He had a very small tumour between the epigastrium and the umbilicus which was slightly tender.

This patient was regarded and treated as suffering from ulcer for six months. May I show you his

stomach removed at operation in which you will notice the uniform and fairly widespread, ring-like, rigid infiltration and this man is still alive after three years.

This case exemplifies the fact that pain immediately after meals which should never fail to set up a suspicion of carcinoma, and the absence of sufficient tenderness in the scarcely appreciable tumour led to a fear of carcinoma and an X ray examination by Dr. Hewlett. The skiagram manifested deformation of contour in the prepyloric region and confirmed this suspicion.

Almost as misleading was the following history of a patient whose condition was for a time erroneously regarded as ulcer.

Mrs. J., aged twenty-seven years, was ill for fifteen months. The onset was that of the ordinary painless dyspepsia. In two weeks she developed pain immediately after food with epigastric soreness and vomiting, the latter giving relief. Her symptoms gradually got worse and after eight months the pain and vomiting were very severe. She had lost 25·2 kilograms (four stone) in weight.

An X ray examination four months after the onset disclosed no lesion.

When I point out that a large gastric ulcer penetrating the pancreas, as in the specimen, gives symptoms unlike an ulcer and like a gastric carcinoma, it will be evident that there is some warrant for confusing carcinoma with ulcer. In these ulcers pain is constant and not severe and not made much worse by food, while the patient looks as though he were suffering from malignant disease (through small, hidden hæmorrhages) has loss of appetite and weight and often, as in this instance, has an absence of hydrochloric acid.

Indeed, sometimes because of youth and for no other reason, a patient with gastric carcinoma may be treated as though he were suffering from ulcer as illustrated in the following interesting case.

N.E., aged thirty years, complained of indigestion, fullness, belching and discomfort from five to thirty minutes after food, associated with mild epigastric pain (a mildly painful dyspepsia). He had a lot of nausea, also vomiting, the latter occurring mostly at night some hours after food. Vomiting gave great relief. Bowels were very constipated, going up to four days without a motion. He improved very much on treatment and was discharged from hospital with scarcely any vomiting and no pain. Pain has gone, but he feels very much distended in the epigastrium and gets relief from vomiting. Constipation has increased.

"Painless Dyspepsia" Onset, "Silent Carcinoma," Pernicious Anæmia Type.

While, on the one hand, a dyspepsia more or less painful may usher in a carcinoma of the stomach, on the other hand it may originate so quietly and with a dyspepsia so painless as to be unremarked by the patient. A progressive anæmia with profound constitutional disturbance characterizes this type and in the absence of a definite tumour it is very liable to be confused with pernicious anæmia. Actually I have seen many cases of "pernicious anæmia" in which autopsy revealed carcinoma of the body of the stomach.

The pathological basis is as a rule a fungating, ulcerating carcinoma in the body of the stomach high in fundus or on the posterior wall and remote from the gastric canal.

Here is the picture and history of a patient, aged fifty-six years, who consulted me because he could feel a big tumour in the upper part of his abdomen.

C.U., aged fifty-six years, had been ill for two months. He complained of very slight discomfort and pain in the epigastrium three or four hours after food of which he took no account, but had come because he could feel a big lump in the upper part of his abdomen. He had no nausea, vomiting or constipation and had lost very little weight.

You can see from the skiagram what a large and distinct filling defect he had and here I show you the stomach itself in order that you may see the kind of growth and compare it with the filling defect.

This patient is still alive after nearly four years.

Here, again, is the stomach of a patient, K.V., who presented herself because of sickness and frequency of micturition and because she also could feel a tumour. Though suffering from a painless dyspepsia, she did not feel sick so she said. This patient died three years after her operation.

As a contrast to and unlike the patients mentioned above in which no difficulty in diagnosis arises because a palpable tumour is present, here is the history of one, R.D., in whom no tumour was palpable and who suffered for twelve months from profound ill-health the cause of which could not be ascertained even after many medical examinations.

R.D., aged fifty-three years, was ill for twelve months. He complained that he was unable to work and was not feeling well. He had lost 12·6 kilograms (two stone) in weight in twelve months. He had a fair appetite and some fullness after meals, but no pain. His bowels were a little more constipated than they used to be. No tumour was felt. Only a lateral X ray photograph revealed a constant filling defect. Antero-posterior radiographs revealed a "filling defect" present in one photograph and not in another.

The skiagram by Dr. Cross reveals a large dumb-bell filling defect. A tumour could not be felt because the growth was situated high up under the ribs on the posterior gastric wall and this was the explanation of the inconstancy of the filling defect. This patient because of his anæmia and absence of tumour was erroneously regarded as suffering from pernicious anæmia.

While these patients, although they suffer from such a nauseating dyspepsia, invariably come late and while they are looked upon by surgeons as nearly always inoperable, yet early diagnosis is nevertheless important for two or three of our most successful cases have been of this nature.

"Colonic" Onset.

A "colonic" onset is rare.

A patient with "silent" gastric carcinoma may first come under notice with symptoms which suggest a carcinoma of the colon.

For example, one patient, C.L., sought advice because he had been suffering from alternate constipation and diarrhœa for the previous six weeks in which time he had lost four kilograms (nine pounds) in weight. He had been weak and tired for eight months, had scarcely any dyspepsia, a little flatulence and discomfort. He was very anæmic. No suspicion was attached to his stomach and sigmoidoscopic examination was carried out, but nothing was found. Exploratory operation disclosed carcinoma of the body of the stomach. A tumour was not palpable.

The Painless Dyspepsia of Pyloric Stenosis.

While a pyloric carcinoma may mostly give rise to characteristic symptoms, yet in some cases so slow may be the growth of a scirrhous carcinoma that a painless obstruction results on the same basis as a stone is sometimes painlessly tolerated in the cystic duct. But sickness, nausea and obstructive vomiting with great relief are prominent features.

Notice the following history of B.R., who had a scirrhous cancer of the pylorus, the absence of pain, the long history (four years) and the enormous stomach.

B.R. complained of flatulence, wind, heartburn and bilious attacks beginning four years previously. He had had no appetite for three years. He began to lose flesh fairly rapidly two years ago. Soon after that he began to vomit occasionally. He vomited a large quantity at the end of each day. Never at any time had he any pain after food. He had lost 25·2 kilograms (four stone) in weight and had visible gastric peristalsis.

At operation a pyloric carcinoma with an enormous stomach was found.

The quiet and insidious onset of this last case of pyloric scirrhus may be mimicked by a cicatrizing ulcer of the posterior duodenal wall in which situation a duodenal ulcer may be almost "silent" for years.

So painlessly did a stenosis appear in one patient with all the appearance of a malignancy that I diagnosed a malignant pylorus. Operation disclosed an old cicatrized duodenal ulcer and an enormous stomach which was presumptive evidence of a long history.

When cicatrization takes place in a duodenal or prepyloric ulcer, the characteristic pain of ulcer and the deep tender spot disappear so that the condition is indistinguishable from carcinoma except for the very definite precedent symptoms of ulcer and, as in our series every case of pyloric stenosis preceded by definite symptoms of ulcer was innocent and carcinoma never developed on ulcer, then a diagnosis of previous ulcer should practically have excluded malignant disease.

"Dysphagia" Onset.

Dysphagia onset is exemplified by the following history.

A man complained of dysphagia and ill-health. A carcinoma of the œsophagus was suspected. An œsophagoscopic examination disclosed no obstruction. Cardiospasm was then suspected and he was treated. Some months later exploratory operation revealed a carcinoma of the fundus not far from the cardiac orifice.

Errors in Diagnosis in "Silent" Carcinoma.

Realizing this painless onset of gastric cancer the diagnostician in his anxiety to obtain an early diagnosis may fall into error and mistake diseases like pernicious anæmia or Addison's for carcinoma of the stomach, unless the clinical diagnosis is carefully checked by skilled X ray examination.

For examination a patient had all the symptoms of and appeared to me to be suffering from "silent" carcinoma of the stomach. Careful examination, both surgical and medical, which included a blood examination, did not elicit anything definite and with considerable diffidence I decided against exploration. He died in South Africa two years later of pernicious anæmia.

In all of the following a diagnosis of "silent" gastric carcinoma was erroneously made: Low grade pancreatitis, carcinoma of the body and tail of pancreas, œdema of the stomach from gradual heart failure probably with a renal element, Addison's disease, fungating carcinoma of the œsophagus without obstruction, the big lumpy type of enlarged liver and dyspepsia of cirrhosis both of which occur in cirrhosis of liver.

Significance of Certain Symptoms and Signs.

Constipation.

Constipation occurred in all cases and in some more than others and particularly in carcinoma of the pylorus in which the onset was sudden and the course progressive. It is probably due to a lesser intake of fluid, vomiting and reflex causes, but when it occurs in a previously unconstipated patient and is progressive in spite of treatment, it is a most significant sign of gastric cancer.

Hæmatemesis.

Hæmatemesis is generally a late sign of malignant disease of the stomach and if it is due to this disease, some other tangible evidence will be present such as tumour or a characteristic dyspepsia. I have found in my experience that a sudden and profuse hæmatemesis in old men without any symptoms or signs is much more often due to a non-malignant than to a malignant cause.

Epigastric Rigidity.

Epigastric rigidity may be the only local sign and this may be present before tumour is manifest. This rigidity, however, may denote an involvement of the parietal peritoneum and inoperability.

Tumour.

The absence of a tumour does not exclude diagnosis of carcinoma. Tumour is absent in an early scirrhus of the pylorus and in those cases of a spreading infiltration in which pain is a feature, as in Mrs. J. and the patient T.R. It is impalpable when situated high in the stomach under the ribs or in the posterior gastric wall as in R.D.

The presence of tumour does not always denote inoperability for, as I have mentioned before, three of our most successful partial gastrectomies were in patients who had discovered a tumour.

An "ulcer" tumour either on clinical examination or at operation may be indistinguishable from a malignant tumour and it is unwise to accept a tumour as an infallible sign of malignant disease.

Here was a most instructive mistake:

S.T., aged fifty-six years, had a palpable tumour in the region of the stomach and was operated on in the belief that he had a gastric carcinoma. At operation, the tumour was still regarded as undoubtedly malignant and a palliative gastro-enterostomy was done and the patient was told to prepare for death. With incredible optimism he battled for a favourable opinion; even expert X ray specialists pronounced against him and diagnosed malignant disease; finally he came under Dr. R. R. Stawell who, noticing that magnesia gave him extraordinary relief, carefully reviewed

the whole history and X ray findings and had him re-operated on when a large penetrating ulcer of the pancreas was found to be the cause of his apparently malignant tumour.

A tumour, to all intents and purposes malignant and inoperable, in a very emaciated and wasted patient is not necessarily always malignant as the following cases will show:

Mrs. W. presented herself with an epigastric tumour, large, irregular and of characteristic hard nodular feel. She was cachectic and wasted and with the appearance of malignant disease. Even at operation this tumour of the lesser lobe of the liver, lying on the stomach, was regarded as malignant, until an incision was made in it when an old degenerated hydatid with a wall 1·25 centimetre (half an inch) thick of cartilaginous character was disclosed.

Again, a woman, Mrs. B., was sent for a consultant opinion merely to relieve the consciences of her relatives. She had a big liver which appeared to be undoubtedly malignant, and she looked to be in the last stage of a malignant stomach. She had an enormous and mildly suppurating hydatid which did not give rise to fever.

Aids to Clinical Diagnosis.

It is always wise after taking the history to group symptoms and signs and to simplify, recast and re-write the history and try to come to a conclusion from a clinical observation only; then and not till then must we call in our other aids.

The test for occult blood must never be omitted, for it will be found to give extremely valuable evidence when least expected.

The Test Meal.

McLean in his recent book on gastric diseases gives a table of one hundred cases of carcinoma of the stomach, proved by operation, in which the hydrochloric acid was absent in 87%.

He says:

Absence of hydrochloric acid and the presence of appreciable amounts of lactic acid in the test meal is the usual rule in carcinoma of the stomach.

And he further adds that:

Statements purporting to show that free hydrochloric acid is quite often associated with gastric cancer are based on defective technique in analysis coupled with erroneous diagnosis.

He goes on to say that when hydrochloric acid is found in gastric cancer it has been mistaken for an excess of lactic acid which in concentration changes the colour of diamidoazobenzol and that if the Gunzberg test had been done, the absence of hydrochloric acid would have been shown. He suggests a new and reliable test for lactic acid and says that the old test is unreliable.

He uses a single meal made of a shredded wheat biscuit cooked with a pint of water which is extracted one hour afterwards with the Einhorn tube.

It would appear from these definite and authoritative statements that we have not taken full advantage of the enormous value of the test meal in early diagnosis of gastric cancer.

I place great reliance on the test meal, but in my opinion the fractional test is even of more diagnostic value than the single meal, but even from an extensive experience of it I only wish I could draw such clear and definite deductions as those given above. To be of any real value to the surgeon the hydrochloric acid test should give a definite indication of malignancy early in the disease, but I can find no evidence to show that any of the cases quoted are early.

Dr. Apperly has kindly placed at my disposal the fractional test meal charts of twenty cases of proved carcinoma. A study of these reveals that hydrochloric acid is present, but diminished in 20% of cases and absent in the remainder, that the diminution or absence is caused by a lessened secretion rather than by an excessive regurgitation and that in all cases the total chlorides are diminished.

Dr. Bell, of Melbourne, who has had a large experience in the fractional test does not think that the single meal can be depended upon to give reliable information and says that the absence of the hydrochloric acid cannot be relied on as a diagnostic point, for in a great number of gastric cancers he has found hydrochloric acid present and in some instances in normal concentration, as shown in the following table which he has placed at my disposal:

TABLE SHOWING STATISTICS BASED ON FIFTY-SIX CASES OF CARCINOMA OF STOMACH IN ALL STAGES, ALL DIAGNOSES BEING PROVED BY OPERATION, POST MORTEM FINDINGS AND IN A FEW CASES BY INDUBITABLE X RAY APPEARANCES.

Gastric Secretion.	Carcinoma of Stomach.
Achlorhydria	45%
Hypochlorhydria	7%
Low Normal	28%
Normal	15%
High Normal	3%
Hyperchlorhydria	0%

Dr. Izod Bennett (*The British Medical Journal*, August 18, 1923) deplores the faint praise accorded this method in modern text-books. He says:

My experience leads me to believe that it is exceedingly rare for a case of carcinoma of the stomach to present itself for examination without the diagnosis being definitely established as soon as gastric analysis is performed.

My own experience is that the fractional test is extraordinarily valuable, while it is so simple and undistressing to the patient. It has been valuable to me in the diagnosis of the nature of a stenosis at the pylorus and in patients whose pain was such a feature that the diagnosis from ulcer was difficult. In both instances hydrochloric acid has invariably been absent in carcinoma, whereas in ulcer and ulcer scar it has been present to a greater or lesser extent and has established a diagnosis between an ulcer scar and malignant disease when an X ray examination could not. As a set-off to this there is the observation that in one of my cases of ulcer of the posterior gastric wall penetrating the pancreas, clinically simulating carcinoma of the stomach, hydrochloric acid was absent. I would, however, unhesitatingly advocate the greater routine use of the Einhorn tube and the fractional test meal in the diagnostic problem of gastric cancer and in

addition to the hydrochloric and lactic acid tests a total chloride estimation. Indeed, if the Einhorn tube were used more frequently by the general practitioner, there would be less inoperable cases of gastric cancer. Blood and pus obtained at the test meal have also been valuable evidence to us in making a diagnosis of carcinoma.

X Ray Diagnosis.

Nothing is more important or more valuable than the use of X rays in diagnosis, but as carried out at present it does not always fulfil its possibilities. X ray diagnosis should be superimposed on the clinical history, an additional sense whereby we can improve our knowledge of the existing pathological condition and also of the pathological physiology.

The history should direct special attention to certain parts of the stomach on which repeated examination may reveal disease while with a single or superficial examination it may be missed. For instance, I have many times seen carcinoma in the fundus of the stomach near the œsophagus missed by X ray examination, although the history would have directed special attention to this part and a reexamination by X rays after an exploratory operation showed that there should have been no difficulty in recognizing the lesion. I have even seen "negative" X ray reports when a palpable tumour of the stomach was present unknown to the radiographer. If the physician or surgeon cannot be present at the examination, a careful, written history should be given to the radiographer with the important symptoms underlined. The most mistakes in the early diagnosis of carcinoma seem to occur in the prepyloric region where phases of the deep peristaltic waves are confused with early filling defects and *vice versa*. Many apparently normal gastric radiographs, carefully examined in close conjunction with history, showed definite, recognized filling defects and still more after an exploration it was painfully obvious that there had been enough X ray evidence on which to make a fairly positive diagnosis. Deformation of the contour in this region is much more often due to an intrinsic gastric cause such as carcinoma than to any extrinsic cause such as gall bladder. In fact in a large number of operations for biliary disease I see only rarely an instance in which even in the most diseased gall bladders possible mechanical deformation of prepylorus or duodenum could occur and yet I am always finding this given in X ray diagnosis as an explanation of defective contour. In my opinion mechanical deformity of duodenum and prepylorus by a gall bladder lesion is rare. Here are four slides in which I thought the lesion was prepyloric carcinoma, and the radiographer thought that it was caused by extrinsic gall bladder.

One patient actually had an enormous carcinoma of the gall bladder and the infiltration involved the prepylorus, duodenum and colon. Notice what a great deal of gall bladder disease was necessary to cause this deformation and this was clinically evident.

In the three others carcinoma was the lesion present. Such a deformation would require such an extensive gall gladder lesion that clinical manifestations should obviously be present.

Filling defects of the greater curvature, often explained as artifacts from the adjacent colon, sometimes turn out to be malignant. Above all it is necessary that filling defects, deformation of contour, indefinite edges, must be shown to be permanent by repeated palpation under the screen and by repeated photographs. Yet disappearance of a filling defect in a subsequent radiograph does not negate malignant disease, for localized tumours of the posterior gastric wall are difficult to recognize and allow this to happen. A filling defect in one photograph had disappeared in the next and this inconsistency according to X ray dogma precluded a diagnosis of carcinoma, but, as often happens, a localized, flat growth on the posterior gastric wall allowed this to occur. Here in the slide which I now show, exactly the same thing happened when the growth was in the anterior wall. In these, anterior or lateral views and photographs must be studied carefully.

Ulcers in the posterior wall penetrating the pancreas often give a similar history to carcinoma and are also confused in X ray diagnosis with carcinoma in this position. They can be found by careful lateral inspection.

Where infiltratory character is suggested by severe pain, search carefully for irregular and unsymmetrical alteration in the contour or rigidity of the gastric wall and palpate every square inch of the gastric wall with a strong wooden spoon to detect this.

When from the silence of the history a filling defect is expected, concentrate attention on the lumen of the stomach. The hour glass contraction of carcinoma is entirely different to that of ulcer. It is central and the unsymmetrical isthmus between the two sacs is often irregular with indefinite edges.

Never fail to examine the œsophagus as a routine.

Recently I received an X ray report of carcinoma of the pylorus in an extraordinarily ill and emaciated man with an enormous dilatation of his stomach and a long gastric history, twenty years. With great trepidation and precaution an operation was staged and carried out and with great satisfaction the obstruction was found to be not carcinoma, but the scar of an old ulcer; a quick gastro-enterostomy was done and the reprieve in prognosis was hailed with delight by the patient, but alas a week after he left hospital and for the first time he complained of dysphagia. The acute exacerbation in his long, innocent, gastric history was due to the onset of a carcinoma of the œsophagus without obstruction in the first stages.

A very deep peristaltic wave indicating hypertrophy and a six-hour emptying time taken in conjunction with low hydrochloric acid with onset of painless dyspepsia in a sthenic person may indicate early carcinoma of pylorus.

Exploratory Operations.

In some very early stages I make an inch incision under local anæsthesia and explore the stomach. The patient may be allowed up in a week. I also do this in late cases in order to ascertain the

operability. The short time in bed avoids the lack of tone usually attendant on three weeks in bed and enables them to spend the remainder of their life on their feet.

Acknowledgment.

I wish to acknowledge the help which my assistant, Dr. Kinsella, has given me in arranging and collecting material and data and skiagrams *et cetera*.

Reports of Cases.

A CASE OF SIMPLE GASTRIC ULCER, CLINICALLY SUGGESTING CARCINOMA VENTRICULI.

By C. BICKERTON BLACKBURN, O.B.E., M.D., Ch.M. (Sydney),
Honorary Physician, Royal Prince Alfred Hospital, Camperdown, Sydney.

I THINK this case is worthy of record as indicating the difficulties that may arise in the diagnosis between simple ulcer and *carcinoma ventriculi*.

The patient, a lady aged fifty years, was seen by me on March 24, 1926. I have known her for some years, but have not seen her before professionally.

She complained that she had had indigestion for five months. Her previous gastro-intestinal history was clear, except that on three occasions in the last few years she has had attacks of severe epigastric pain with vomiting and purging. Each attack lasted only a few days. Two attacks had been diagnosed as "ptomaine" poisoning and in the other the medical attendant suspected gall stones.

In the present illness she has had frequent vague epigastric pain and discomfort, not necessarily related to food. It has often been present on waking in the morning. Lately it has often seemed to go through from the epigastrium to the back of the lower part of the left side of the chest and sometimes seemed to go down the left arm. She has had a good deal of flatulence, usually relieved by "soda mint" tablets. Often she has had nausea and occasionally regurgitated what seemed like plain water; she never vomited food. Her appetite was not good, but she has been able to take her food fairly well, though without enjoyment. Her weight was about 3·1 kilograms (seven pounds) less than her winter weight, but this is usually the case at the end of the summer. Physical examination revealed very little. She was slightly but definitely tender in the upper part of the epigastrium, more towards the gall bladder region than anywhere else. No abnormal mass could be made out. The stool after thirty-six hours without any animal food gave a definite reaction for occult blood.

Dr. Sear examined her by X rays and reported that no gall stones were seen. The pyloric end of the stomach was somewhat contracted, the thickening being possibly due to spasm and possibly to a small ulcer. There was increased peristalsis and a slight delay in evacuation, the stomach retaining a trace of the meal in six hours. The only abnormality in the intestines was a definite degree of ileal stasis.

Dr. Hansman's report upon a fractional test meal was to the effect that the residual contents were fifty cubic centimetres in quantity and slightly bile stained, occult blood being present. Very numerous pus cells and many epithelial cells were present. A definite reaction to the test for lactic acid was obtained. The stomach was empty in two hours. There was no titratable free hydrochloric acid in any sample. There was a trace of free acid at sixty and eighty minutes.

Operation was accordingly advised and was carried out by Sir Alexander MacCormick on April 16, 1926. Definite pyloric thickening was found and partial gastrectomy and appendicectomy were done.

Macroscopical examination of the specimen showed that the pylorus was uniformly thickened. On the lesser curvature five centimetres (two inches) from the pylorus an area of thickening was detected towards which a number of dilated veins converged. In the centre of this thickened area there was a chronic ulcer, twelve by six millimetres (one-half by one-quarter of an inch) in dimensions, irregular in outline. There was no crater as the floor of the ulcer was only very slightly below the level of the surrounding mucosa.

Professor Welsh reported as follows: A series of sections was taken including: (i.) the pyloric thickening which was due to muscular overgrowth; (ii.) ulcer on lesser curvature which proved to be of simple inflammatory origin without evidence of malignant disease; (iii.) portion of stomach between (i.) and (ii.) which showed only inflammatory changes.

GASTRO-ENTERITIS FOLLOWED BY PNEUMOCOCCAL PERITONITIS.

By HILDA E. KINCAID, D.Sc., M.B., B.S. (Melbourne),
Senior Resident Medical Officer, The Renwick Hospital for Infants, Sydney.

THE following history of a baby with gastro-enteritis and a terminal pneumococcal peritonitis is unusual.

On November 9, 1925, twin girls aged five months were admitted with a history of vomiting and diarrhœa for one week. The smallest one was moribund on admission and died half an hour after admission.

On examination the bigger one looked ill. Nothing abnormal was found in the throat, heart, lungs or abdomen and she was not wasted. The urine was acid with a cloud of albumin and a few pus cells. Diarrhœa and occasional vomiting persisted in spite of treatment and the child steadily lost weight. Twenty-four hours before death she became cyanosed and the abdomen slightly distended. No rigidity was present. The child died on November 26, 1925.

On *post mortem* examination, the abdomen was found to contain purulent fluid containing pneumococci. Numerous ulcers were found in the mucosa of the ileum with fewer and larger ulcers in the caecum and large intestine. Many glands in the mesentery were enlarged. Kidneys were the seat of acute nephritis. Heart and lungs were normal.

Reviews.

ABNORMAL AND DEFECTIVE MENTALITY.

S. D. PORTEUS'S collection of studies chiefly deals with mentally subnormal or abnormal children both in Australia and America.[1] About 1913 Mr. Porteus, then a trained teacher in the Victorian Education Department, was selected to inaugurate the Special School for the Feeble-minded in Victoria. Later he carried out with Professor Berry at the Anatomy Department, Melbourne University, investigations into the correlation of anthropometric measurements such as cranial capacity and various forms of mental deviation. About this time in an endeavour to obtain a practical estimate of the capacity for prudence and foresight he developed and standardized the maze test based on certain tests of intelligence in birds. This has since been generally adopted as in some measure suggesting social sufficiency.

In 1919 the famous Vineland School, New Jersey, induced him to migrate and gave him further opportunities for testing and observing a wide selection of children.

[1] "Studies in Mental Deviations," by S. D. Porteus; 1923. Published by The Training School at Vineland, N.J. (U.S.A.), Department of Research, No. 24, October, 1922; Royal 8vo., pp. ix. + 276, with thirteen figures.

Admitting that this most important subject bristles with difficulties and that we are still dealing with vague formulæ of the essential nature of which we are still in the dark, this volume, viewing the problem as it does from many angles, is full of valuable practical experience and should be of distinct value to all workers in the subject. Perhaps most of all should it be of assistance to medical observers as presenting fields of study with which they are not so intimately acquainted.

Porteus concentrates chiefly on the conception of the feeble-minded child as the potential and permanent social inefficient. Prophecy is always a difficult matter and the determination of the future community value of the defective involves a thorough all-round investigation and considerable direct personal study of the individual, guided by extensive experience on the part of the examiner.

Even the "placement" of the defective in an institution Porteus points out is not purely a matter of mental level, though that is the most important single factor. Physical retardation or precocity, personal and sex habits, delinquent tendencies, social characteristics and psychopathic traits among others, influence his classification.

He rightly points out that the intelligence quotient estimated by the Binet test is symptomatic rather than diagnostic of mental defectiveness. The degree of maladjustment is especially important. "Psychopathic" is a word much used in America for certain of these maladjusted children whose irregularities of behaviour are abnormal and whose temperament is difficult. They are out of touch with their environment. Four common types have been described—the thin, restless, neurotic, overactive and over-emotional type; the apathetic, sluggish, over-suggestible and inadequate; the egoistic and cruel individualist; the timid, hypersensitive child with its inferiority complex. Unstable is perhaps the term most used in England and Australia. They may be quite clever in certain directions, but their mental twist inevitably spells failure, even though their intelligence is not so retarded as that of other groups. Cranial capacity is discussed and Australian norms and percentiles given for comparison. He considers that a median brain capacity with low mental level and cranial index deviating from the racial average suggests the psychopath. In this connexion some interesting studies are given of sensory defectives (blind, deaf and dumb) and of aborigines.

Porteus himself is best known as the designer of the Porteus maze test. The Binet test, though generally reliable, often failed to give estimate of industrial adaptability or of social adjustment. The need appeared for a concrete test, practical and non-linguistic. A series of mazes of progressively difficult character standardized for age was, therefore, arranged by him and has been generally adopted.

While it is unlikely that any single test can hope to fit human beings into pigeon holes of character, the Porteus test has the advantages of simplicity, independence of language or of school attendance. It is attractive to the child and not a test of previous memory of experience. Young children, delinquents, truants, adolescents some years after leaving school, alien races, are instances in which its practical character makes it most useful.

Porteus considers it more closely tests prudence and foresight, the capacity for taking pains and common sense and so gets closer to the heart of the definition of feeble-minded—social insufficiency—the inability to manage his affairs with ordinary prudence and foresight—than any other single test. A very interesting experience with the Australian aborigine is given—the aborigines progressed up to eight or nine like white children and could reach the fourth grade, but rarely gained further promotion. Only one child, probably a half-caste, obtained as high as twelve years' credit and 50% were definitely retarded. School medical observation revealed pubertal precocity.

In testing normal boys and girls of higher social grade the boys as a whole were found superior to girls, apparently a question of planning capacity, irresolution in a new situation and suggestibility combining to explain the girl's inferiority. In lower social grades the sex difference was less pronounced. Corresponding with the physical tests of height and weight, we find tests for girls at twelve to thirteen, their period of most active rate of growth. Compared with the Binet test the Porteus tends to score higher, the higher the mental age, due, he considers, to the stronger association of these practical capacities with normality than the more literary type of test. It is only in low grade and in psychopathic persons that the Binet tends to exceed the Porteus. He consistently uses the Binet-Porteus average as the best estimate of social competence. To meet the case of children who fail or partly fail at tests below their mental level, as in the "scattering" of the Binet test, he suggests a diagnostic score or discount, for example in complete failure in test two years below mental age or second trial in a test three years below he deducts one year from the mental age. The test can be reapplied as an inverted maze test within quite a brief period. It is curious to note that the temperamental failure of certain types quite defeats any gain that might be expected by familiarity with the test.

A new form and assembling test is described as a further check on the Binet and Porteus. The form board picture completion tests, mechanical and construction and assembling tests are well known. Porteus has outlined a test which seeks to combine all their best points and which he claims works well from six to sixteen years of age. The test is ingenious and is worth an extensive trial.

In more recent times many attempts have been made in America to give a numerical estimate not only of intelligence, but of the more difficult characters, of conduct and personality and industrial efficiency. Whether such an estimate is truly scientific is debatable; the personal factor of the examiner and the variability of environmental conditions must tend to variable results. When the examiner and the environment, as in an institution, are both fairly constant, such estimates may possibly be of value both for classification and to a lesser extent for prognosis.

A very interesting attempt at a social rating scale along these lines is described. Traits were selected as characteristic of social inefficients and children were rated by trained observers on a three point basis—three points for excess, one point for relative absence of the particular trait. Appropriate weightings were given to traits according to their presumed importance—lack of planning capacity and executive ability, 6; suggestibility, 3; impulsiveness, 2; nervous or excitable nature, 2; silly or obtrusive nature, 2; irresolution, 2; moodiness, 1. The sum of these social inefficiency indices were found to correlate satisfactorily with general social estimates drawn from the daily experience of the child. It is acknowledged that no cognisance is taken of thieving or sex propensities or of single exaggerated traits. It appears worthy of the attention of psychiatrists as giving a more definite, simple, concrete expression of terms such as "shut in," egoistic *et cetera* in general use.

Porteus claims a close correlation not only with institutional findings, but also with the study of persons on parole as in Dr. Bernstein's scheme at Rome Colony, New York.

Two other scales of more direct and practical applications are given. An educational attainment scale which takes about fifteen minutes to apply, should be useful in deciding both the result and the arrangement of school work for defectives.

Another interesting and useful scale which may be of distinct value in institutes, is an industrial rating scale. Porteus carried out a job analysis of every occupation and industry at the Vineland Colony from the point of view of defectives, the manual skill involved, the judgement of form, size *et cetera* necessary, the value of the material as affecting practice, such as cleaning glasses, importance of the work itself as handling food, waiting on table, the personal risk associated as in driving horses, doing electrical work and the responsibility or degree of supervision exercised as in the farm or institution and finally the machinery.

The scale runs from farm work, twelve points; woodwork, shoe repairing, table waiting, dairy work *et cetera* ten and a half; cooking, ten; laundry work, needlework, nine and a half; poultry farming, broom making, nine; housework and basketry, seven; pantry and kitchen

work, six. The operation must be done without direction. In individual occupations index values are given for the detailed operations. Some scale of this character is necessary if work with defectives is to be conducted on anything but a purely rule of thumb method.

Porteus's book is a notable contribution to the study of an acknowledgedly difficult subject. His discussion of his own work is characterized by fairness of outlook and his explanatory criticism is the best part of the book. The problem of the recognition and training of the mental defective and his *confrères*, the delinquent and the psychopath, represents one of the greatest problems of the immediate future in child welfare and community life. Porteus's contributions are deserving of the careful consideration of psychiatrists, psychologists and educationalists. It has the added attraction as the work of a native born and trained Australian. Porteus's work and tests have attracted considerable attention in America and to some extent in England. It is strange or perhaps it is not strange, for a prophet has no honour in his own country, that Porteus is a little read and studied in Australia. It is true, however, that we accord honour where honour is due and "Studies in Mental Deviations" should take a merited place in Australian professional libraries.

A NEW PRESENTATION OF PHYSIOLOGY.

IN "A Textbook of Physiology" Professor H. E. Roaf has departed considerably from the traditional methods of presentation of the subject of physiology.[1] Instead of treating such a subject as respiration in all its aspects in a single section, he considers different aspects in quite different parts of the book.

The book is divided into four parts: I. Mechanical Aspects, II. Chemical Aspects, III. Regulative Mechanics, IV. Maintenance of the Individual and Reproduction of the Species.

Respiration is considered under the heading "Respiratory Mechanics" in the first section, "Chemistry of Respiration" in the second section and "Integration of Respiration" in the third section. Other systems are treated similarly.

In the first section are grouped all the gross mechanical processes of living structures. In the later sections the finer details are dealt with as already indicated.

The method has obvious disadvantages, but it is an interesting mode of approach and may help the student to realize that individual systems have not to be considered as separate and distinct units, but that their functions are correlated with those of other systems.

The applications of physical principles in physiology is particularly well done in this book. In the section on the laws of solution are considered the fundamental concepts of surface action, mass action, electrical conductivity, ion concentration and even membrane equilibrium in a brief but very clear manner.

The illustrations are particularly good and useful. An unusual feature is a section on experimental psychology.

While the treatment of some aspects of physiology seems too brief, the book as a whole presents an excellent account of modern physiology and can be highly recommended.

RECENT ADVANCES IN PHYSIOLOGY.

PROFESSOR LOVATT EVANS calls his book "Recent Advances in Physiology" an elementary textbook of advanced physiology and this in a measure well describes it.[2] Certain aspects of of physiology have been taken and lucid accounts written of the modern developments in these branches.

There are three chapters on the blood, largely cytological. "The Carriage of Carbon Dioxide by the Blood" and "The Reaction of the Blood" are the next two chapters. Then follow two chapters on the circulation, "The Output and Work of the Heart" and "The Capillary Circulation." The "Mechanism of Tissue Oxidation" and "The Chemistry of Muscular Contraction" are the next chapters, followed by "Physical Aspects of the Physiology of Muscular Contraction" and "Application of the Physiology of Muscular Exercise in Man as the Results of Researches on the Chemistry and Physics of Contraction." There is a chapter on some endocrine principles and finally "The Mechcanism of Postural Reflexes and the Functions of the Labyrinth" and "Conditioned Reflexes."

The book is not of equal merit throughout, but there is litfle that is not good and it is right up to date. The accounts of the work of Pavlov and of Magnus on reflexes are particularly valuable, for there is no other general account of these in English. The presentation throughout is interesting and, considering the difficulties of some parts of the subject, very lucid. It is a very valuable book and should be read by everyone wishing to know the modern trend of physiology.

NURSES AND CHEMISTRY.

"A TEXTBOOK OF CHEMISTRY FOR NURSES" by Fredus N. Peters, A.M., Ph.D., is a thoroughly bad book.[1] In the preface the author says: "This book has been prepared, therefore, with the idea of more fully equipping those whose angelic visitations and watchful care must inevitably wield an ever increasing influence upon unfortunate humanity . . . . The author has aimed at all times to be scientific and truthful." Unfortunately he has not succeeded and the book is full of errors and misstatements.

The ground covered is large and it is difficult to see of what possible use much of the information could be to a nurse. The arrangement of the book is very curious, for example hydrogen, oxygen, the halogens and their compounds have been treated before chemical symbols are mentioned.

There are, of course, some good points in the book, but the method of presentation, the sketchiness of the information and the frequent mistakes more than counterbalance these.

CYSTOSCOPY IN THE FEMALE.

OWING to the fact that no small volume has been published on genito-urinary diseases in the female, Fulkerson has published a compact book of two hundred and twenty-seven pages entitled: "Gynecologic Urology." The author does not claim this to be very comprehensive, its object is to give students a working knowledge of the subject. In this it seems to justify its claims, as it touches on all the main female urological complaints and is extensively illustrated.[2]

Attention needs to be drawn, however, to two main points. In the chapter on the urine the chemical side is dealt with and the significance of various foreign constituents is discussed, but no mention is made of microscopical examination or the means of detecting and differentiating between the elements present.

The subject of anæsthesia, both general and local, is summed up in a little more than half a page. This is owing to the fact that in all cystoscopic and endoscopic investigations the author does not consider any form of anæsthesia necessary, even in extremely young children. This is not the practice adopted by the majority of competent urologists.

[1] "A Textbook of Physiology," by H. E. Roaf, M.D. (Toronto), D.Sc. (Liverpool), M.R.C.S., L.R.C.P.; 1924. London: Edward Arnold and Company. Royal 8vo., pp. viii. + 605, illustrated. Price: 25s. net.

[2] "Recent Advances in Physiology," by C. Lovatt Evans, D.Sc. (London), F.R.C.S., L.R.C.P., F.R.S.; 1925. London: J. & A. Churchill; Sydney: Angus & Robertson, Limited. Demy 8vo., pp. 364, with illustrations. Price: 12s. 6d. net.

[1] "A Textbook of Chemistry for Nurses," by Fredus N. Peters, A.M., Ph.D.; Second Edition; 1923. St. Louis: C. V. Mosby Company; Post 8vo., pp. 302, illustrated. Price: $2.50.

[2] "Gynecologic Urology," by Lynn Lyle Fulkerson, A.B., M.D., F.A.C.S.; 1925. Philadelphia: P. Blakiston's Son & Company. Royal 8vo., pp. xiv. + 247, with 166 illustrations.

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Vaccine Therapy.

In spite of or perhaps because of the enormous literature that has accumulated within the past twenty years on specific vaccine therapy, there appears to be at the present time much confusion concerning the use of vaccines in the treatment of microbial disease. A few years ago immunologists endeavoured to formulate some rules on which to base a justification for the introduction and employment of vaccines. In his admirable textbook Professor Hans Zinsser in 1918 arrived at the conclusion that vaccines must be quite useless in acute, generalized infections and unnecessary in infections when the defensive powers of the body suffice to overwhelm the infecting bacteria. He found further that in those infections in which the balance of power between the bacteria and the defensive mechanism is almost equal, with the result that a slow, chronic, localized disease occurs, vaccines would be useless unless the factor preventing spontaneous healing were an inadequate supply of antibodies. He admitted that the use of vaccines is logical in the event of a localized infection recurring after healing. He postulated for this type of infection a small balance of antibody, a balance that leads to healing, but has nothing over to render the cure permanent. In generalized systemic infections he maintained that antibody formation fails not on account of a deficiency of antigen, but because the large excess of antigen has paralysed the reacting mechanism. In subacute or chronic infections he held that vaccines could not be "absolutely condemned" on theoretical grounds.

The opinions today are somewhat different. Professor J. C. G. Ledingham has recently expressed his views on this subject. He attacks the problem from the point of view of the response to the antibody. Certain organisms, such as the typhoid bacillus and cholera vibrio, are susceptible to lysis, while bacteria like the staphylococci and streptococci are not killed by the serum of animals previously "immunized" with these organisms. He has thrown overboard the opsonic index as a measure of immunity and with it has gone the idea that vaccines can act in virtue of their ability to induce an augmentation of the phagocytic power of the leucocytes. The possibility of clinical benefit resulting from the employment of a staphylococcus vaccine in furunculosis is, according to Professor Ledingham, not ascribable to a specific action, for equally good results can be obtained with typhoid or colon bacilli vaccines. In other words the therapy is in fact dependent on the introduction of non-specific bacterial protein.

It seems that this altered conception of the place of specific vaccines in therapeutics is due to the fact that the clinical effects have been observed without a sufficient control by experiment. For the present the physiological effect of the injection of a colloid need not be discussed. It is important to recognize the limited sphere of action of specific vaccines, if the existing confusion is to be removed. Professor Zinsser would have us refuse to employ vaccines in pneumonia, enteric fever, dysentery, cholera and plague; Professor Ledingham attributes any clinical benefit in diseases caused by bacteria with which Pfeiffer's phenomenon cannot be elicited, to protein action. Some bacteriologists and many clinicians claim that pneumonia and gonorrhœa are influenced by the coccal vaccines, provided that the types employed are those which produce the infection. The evidence of this, however, is unconvincing. Professor Zinsser's argument may be accepted that vaccines cannot act specifically if the antigens have already produced an excess of antibody within the infected body. In the present state of our knowledge we must assume that vaccines act exclusively as bacteriolytic agents. Consequently it is useless to inject bacterial emulsions that are incapable of lysis, for a specific action. The sphere of vaccine therapy would therefore be narrowed very considerably. With very few exceptions an injection of nuclein would probably be just as effective as any bacterial emulsion. The

exceptions are infections by *Bacillus typhosus*, cholera vibrio or other bacteria which are capable of becoming disintegrated by a specific bacteriolysin, provided that the infections are not so acute that there is already an excess of antigen in the blood stream.

The question of tuberculosis demands special treatment. Tuberculin is held by many to be a vaccine. Dreyer's diaplyte vaccine has been described as a partial antigen and is certainly a vaccine. There are countless bacterial products which are held by those who have devised them, to act specifically in tuberculosis. One thing is certain; tubercle bacilli do not undergo bacteriolysis in the presence of any antibody known to exist. Moreover, it has been demonstrated many years ago that milk and other proteid fluids can give rise to reactions indistinguishable from the tuberculin reaction. In the absence of full information it must be assumed that Spahlinger's vaccine is nothing more or less than tuberculin. Dreyer's vaccine has now been shown to be of little real value. It certainly does not call forth the production of a bacteriolysin within the infected body capable of destroying the tubercle bacilli. Smalpage's claims are not to be taken seriously; there is not a tittle of evidence that tubercle bacilli have been destroyed, dissolved or "fragmented" by an antibody in the course of the investigations. Marmorek's contention that young forms of tubercle bacilli when injected into susceptible animals induced an active immunity, was based on a faulty interpretation of evidence. He and many others made an honest attempt to obtain bacteriolysis of tubercle bacilli and failed.

That there is a varying degree of susceptibility toward infection with tubercle bacilli is not to be questioned. As has been pointed out in these columns more than once, it has been proved that a chronic form of tuberculosis characterized by a tendency toward the formation of cavities in the lungs can be produced in guinea pigs by causing a non-lethal infection in infancy with minute quantities of attenuated bacilli and by inducing a second infection after all signs of the infantile infection have disappeared. But the nature of this immunity is not known. There is no evidence that the bacilli undergo any change in the second infection. This excludes bacteriolytic action. It may, therefore, be concluded that tuberculin and other forms of vaccines cannot act specifically to induce this condition of heightened resistance. If it be true, as many believe, that tuberculin is a powerful therapeutic remedy in tuberculosis, the action would have to be regarded as a form of non-specific protein response.

Current Comment.

SUBPHRENIC ABSCESS.

ALTHOUGH subphrenic abscess may result from various conditions, its occurrence is in the vast majority of cases due to appendicitis or to perforation of a gastric or duodenal ulcer. Infection after surgical operation on the biliary tract, the stomach or the duodenum or perforation of an ulcerated Peyer's patch in enteric fever are among the more uncommon causes and trauma by wounds or rupture of an abscess of the liver are still more unusual as the *fons et origo mali*. The associated mortality is high and several reasons may be assigned for this. In the first place the condition antecedent to the abscess is generally one of considerable gravity and the establishment of a subphrenic abscess often finds the patient already exhausted. In the second place diagnosis and location of the abscess may be matters of some difficulty and when surgical operation has been undertaken, adequate drainage may not be easily established. That the primary factor in gaining understanding of the condition and its successful management is a study of the anatomy involved has been shown in a recent contribution by Mr. Lionel R. Fifield and Mr. R. J. McNeill Love.[1]

The communication of these two observers is based on seventy-eight consecutive cases of subphrenic abscess occurring at the London Hospital. It is obvious that the situation of any collection of pus beneath the diaphragm must be considered in relationship to the bare area of the liver—that part of the liver which is uncovered by peritoneum and which is separated from the under surface of the diaphragm by areolar tissue only. Mr. Fifield and Mr. Love refer to this bare area as the right extraperitoneal subphrenic space. They point out that this area is continuous with the cellular tissue in the falciform ligament in a superior direction, inferiorly with the cellular tissue behind the ascending colon and the right lumbar fossa and that it is continuous round the arcuate ligament with the cellular tissue in the thorax. It is thus seen that there is a direct track for infection from a suppurative retrocaecal appendix to extend to the under surface of the diaphragm and on into the

[1] *The British Journal of Surgery*, April, 1926.

thorax without rupture of the diaphragm. The nature of infection in these circumstances is a spreading cellulitis. In the series of seventy-eight abscesses twenty were situated in the right extraperitoneal subdiaphragmatic area. Twelve of these followed appendicitis, one followed perforation of a duodenal ulcer, one tuberculous periosteomyelitis of a rib, two pyonephrosis and four were of unknown origin. In two cases the suppuration spread forwards over the top of the liver between the layers of the falciform ligament and pointed in the epigastrium.

Anatomically the left extraperitoneal subphrenic space does not exist. When a left extraperitoneal abscess forms, it commences round the upper pole of the left kidney and extending upwards, strips the peritoneum off the diaphragm. In this series there was only one left extraperitoneal abscess, resulting from perforation of a carcinoma of the lower end of the œsophagus.

The position of the right anterior intraperitoneal subphrenic space is described by its name. Amongst its communications is the paracolic groove or right lumbar fossa lying to the outer side of the ascending colon. In the series of seventy-eight cases this space was involved thirteen times. Six of the abscesses followed appendicitis, three perforation of a duodenal ulcer, two perforation of a gastric ulcer and the origin of two was doubtful.

The right posterior intraperitoneal subphrenic space lies below the right extraperitoneal space and somewhat anterior to it. It is often described as the subhepatic space. It is pyramidal in shape and lies transversely beneath the right surface of the liver. In the series under review twenty-nine were subhepatic abscesses. Twelve resulted from appendicitis, five from perforation of a duodenal ulcer, three from acute cholecystitis, one from perforation of the common duct by a gall stone, three from perforation of a gastric ulcer, one as a result of a gastric operation, one from a fractured pelvis and three were of doubtful origin.

The position of the left anterior intraperitoneal subphrenic space is described by its name. It is sometimes known as the perigastric or perisplenic space. In the series under review there were fourteen abscesses of this variety. Eight followed operations on the stomach, three perforation of a gastric ulcer, two perforation of a duodenal ulcer and one cancer of the stomach.

The left posterior intraperitoneal subphrenic space is the lesser sac of the peritoneum. In the series of seventy-eight cases seven were abscesses of the lesser sac. Five resulted from perforation of gastric ulcer, one perforation of an ulcer in the third part of the duodenum and one resulted from acute cholecystitis, being associated with right posterior intraperitoneal abscess.

Mention has already been made of the difficulty often associated with the diagnosis of these abscesses. This is shown from the fact that fifty-nine only of the seventy-eight patients in this series were subjected to operation. Mr. Fifield and Mr. Love point out that some of the patients may not have been suitable for operation, but that the majority might have been given the benefit of surgical treatment had the presence of a subphrenic abscess been suspected. In that statement lies the crux of the whole matter. Unexplained pyrexia in a condition which could possibly give rise to subphrenic abscess, should cause attention to be to be drawn to the under surface of the diaphragm. The deciding factor will invariably be the exploring needle. Even X ray examination will not always lead to a decision. In thirty-seven cases in which X ray examination was undertaken in the series under review, no evidence of abscess was found in seven, in nine an abscess was suspected. In the remainder the radiological appearances were sufficiently clear to clinch the diagnosis. When a search is made for a subphrenic abscess with the exploring needle, the anatomical considerations described by Mr. Fifield and Mr. Love will probably be of assistance, nor must they be forgotten in the subsequent planning of the operation.

DR. BARNARDO'S HOMES.

EVERYBODY is familiar with the words "Dr. Barnardo's Homes." Not everyone has become familiar with the nature and extent of the good work started by the beneficent founder sixty years ago. The headquarters of this wonderful organization are situated in a squalid district in the east end of London and from the outside do not inspire confidence or reflect achievement. Within the gates there is an atmosphere of tranquil progress. The old doctor was determined to raise the submerged and sinking youth to a safe height and those who have worked at Stepney and its many *dépendances*, have succeeded beyond all expectations. Boys and girls are sent from England to Australia from this great home. These children are mentally and bodily strong and healthy. In the course of sixty years 100,700 destitute children have been admitted to be turned into responsible citizens. The present growth of the "family" is five a day. The Homes contain today no less than 7,636 children. Some of them are infants; some are sickly littles ones whom neglect and insufficient food have brought to the brink of the grave. They have to be nursed and tended with care. Each infant and each child are handled individually. It is a costly undertaking, but at the Dr. Barnardo's Homes they realize that human lives are worth money and effort. It costs a great deal to feed over seventy-six hundred children. The organization is appealing for £50,000 for the Dr. Barnardo's Homes Food Fund. For the sake of humanity, out of pity for the miserable and starving children found destitute in the old country, in order to provide a good complement of healthy, happy young citizens of the British Empire, prepared to develope its resources, those who have enough should spare a half crown to help. The organizers want four hundred thousand half crowns. We appeal to our readers to send one or more to the Fund, 18 to 26, Stepney Causeway, London, E.1.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Measles and Gangrene of the Legs.

D. J. HISHON (*British Journal of Children's Diseases*, January-March, 1926) reports a case of measles complicated by gangrene of the legs. J. D. Rolleston comments on the condition and gives a brief account of eleven similar cases previously published. Hishon's patient was a male infant, aged sixteen months. On the second day of the measles rash the child had signs of commencing bronchopneumonia and his condition was poor. Right otorrhœa was present, there being a history of a mastoid operation twelve months previously. The child became gradually worse. The heart sounds were rapid and weak, but regular. There was no sign of endocarditis. The extremities, especially the legs and feet, were cold and blue. The cyanosis at intervals passed off, leaving the extremities cold and pale. Eleven days after admission to hospital distinct patches of discoloration were observed on the dorsal surfaces of both feet. The femoral and popliteal pulses could not be felt, while there was no change in the radial pulse. The discoloration gradually spread and a line of demarcation was obvious on both legs. The systolic pressure taken in the brachial artery had fallen to forty millimetres of mercury. The temperature became subnormal and remained so until death occurred. On *post mortem* examination extreme emaciation was apparent. The skin of both feet and lower parts of both legs was black. A line of demarcation extended round the right leg about five centimetres below the lower border of the patella on the anterior surface and at the junction of the upper third with the lower two-thirds on the posterior surface. Both popliteal and superficial femoral arteries contained *ante mortem* clots throughout their entire course. The left kidney contained a pale infarct on its vertebral border below the hilus. The liver and spleen were engorged. A large vegetation, the size of a pea, occupied the upper surface of the anterior aortic valve.

Lead Poisoning in Infants.

HERBERT B. WILCOX AND JOHN P. CAFFEY (*Journal of the American Medical Association*, May 15, 1926) report two cases of lead poisoning in nursing infants due to the use of lead nipple shields. The first patient was a baby girl, white, aged four and a half months. She was admitted to hospital because of vomiting, failure to gain in weight and "nervousness" of a month's duration. Labour had been normal and the birth weight three kilograms. There had been no previous illness. The child had been breast fed until the time of admission to hospital. She had vomited persistently for the previous month. The vomiting was not related to feeding and occurred two or three times daily. The nervous symptoms made their appearance about the same time as the vomiting. The baby became restless and fretful. She developed head-rolling and her limbs were in motion most of the time. Twenty-four hours before admission generalized twitchings appeared. A slight stupor had been present for twenty-four hours. There was generalized pallor. Bilateral horizontal nystagmus was present. The neck was moderately spastic and bilateral Kernig's signs were obtained. The spinal fluid was slightly opalescent under normal pressure and contained seventy cells, increased globulin and forty milligrammes of sugar per hundred cubic centimetres. Blood examination revealed distinct anæmia with stippling of the red cells. The stippling of the red cells suggested lead poisoning. The mother was questioned and related that she had worn lead shields on both breasts continuously since the day of the patient's birth. Before nursing she had sometimes washed the nipples with boric acid, but more often the infant had been put to the breast without any cleansing of the nipples. The mother had been free from symptoms throughout the baby's illness and her blood was normal. The infant was weaned and potassium iodide was administered. There was an immediate improvement in the baby's symptoms. Chemical examination of the fæces revealed the presence of lead on one occasion. Lead was not demonstrated in the urine or spinal fluid. It was found in the breast milk on two occasions. After careful cleansing of the breast with ammonium acetate lead could not be detected in the breast milk. The second case was that of an infant, aged nine months, who was seen in the out-patient department with a history of vomiting since the seventh month, pallor and loss of weight. The child had been well until the onset of these symptoms at the seventh month. She was fully breast fed. After one month's treatment without any improvement in the infant's condition, the mother stated that she had begun the use of lead nipple shields one month after the birth of the baby and had worn them constantly since. The examination of the blood revealed anæmia with frequent stippling of the red cells. Lead was recovered from the urine and fæces in this case. No lead was found in the breast milk. After weaning improvement was rapid and in six weeks the child was practically well.

Syphilitic Endarteritis in Children.

H. M. GILKEY AND C. C. DENNIE (*American Journal of Diseases of Children*, April, 1926) report two cases of syphilitic endarteritis in children. Acute disease of the peripheral arteries is rare in children. It may be a sequel of an infectious disease, especially of typhoid, syphilis, pneumonia, influenza and rheumatism. The symptoms in these cases consist of fever, swelling of the affected vessel, severe pain, numbness and tingling along its course, diminution of vascular pulsation and, if occlusion takes place, dry gangrene. In congenital syphilis distinct changes have been found in the aorta and peripheral vessels and the *Spirochæta pallida* has been demonstrated in the vascular coats. In rare instances in infants all the arteries are involved and the smaller vessels may be obliterated. Aneurysm of the peripheral arteries is occasionally met with in childhood. A coloured girl, aged three years, was admitted to hospital the day after the mother had noticed a discoloration of the right foot. Previously the patient was apparently well, although always underweight, weighing at that time 6·4 kilograms. The child was born at full term. On examination the child was found to be undersized and poorly nourished with bulging forehead and enlarged anterior cervical glands. The spleen and liver were both palpable five centimetres below the costal margin. The entire dorsum of the right foot was of a bluish hue. The three middle toes and the ends of the great toe and little toe were black. On the plantar surface of the foot was a large black bleb, extending about five centimetres backward from the three middle toes. The temperature of this foot was lower than that of the other and no pulsation could be found in the popliteal space. The result of the Wassermann test was "++++." The other patient, a girl of the same age, had a large ulcer on the outer aspect of the right leg, extending from the external malleolus for one-third of the leg. The child was well nourished and bore no outward stigmata of syphilis. The spleen, however, was palpable and the lower margin of the liver was seven and a half centimetres below the costal margin. The response to the Wassermann test was "++++." Both these patients recovered promptly on antisyphilitic treatment. Each patient received the same type of treatment, namely, 0·15 gramme of "Neo-arsphenamin" intravenously every week for eight weeks. Potassium iodide was given internally. In the first case there was the loss of two toes. Neither patient had pain nor discomfort.

Œsophageal Injuries in Children.

O. HÜBLER (*Wiener Medizinische Wochenschrift*, February 20, 1926) makes an earnest appeal for more rigid restrictions in the storage and sale of strong caustic solutions. He has gathered the histories of one hundred and forty-four cases of stricture of the œsophagus in children under fourteen years of age. In the majority of cases caustic solutions had been stored in open bottles and the unfortunate children had drunk from them without knowing the contents. Over 25% of the cases occurred in children under four years of age. Gastrostomy had to be performed in 22% of the cases. Perforation occurred in seven

cases following the passage of a bougie, whilst in one there was a spontaneous perforation. All eight patients died from broncho-pneumonia or mediastinitis. Many of the children developed scarlet fever whilst in hospital, thus confirming an old opinion. Although the average duration of stay in hospital was twenty-four days, the subsequent bougie treatment was spread over varying periods extending up to a maximum of eighteen years.

Prophylactic Serum for Measles.

W. HAGEN (*Deutsche Medizinische Wochenschrift*, May 21, 1926) gives his experiences with the serum of Degkwitz in an attempt to limit the spread of meales among children at home or in school. The results were found to be better when used among the children of a family at home rather than among those at a *Kindergarten* school. It was usually given between the seventh and ninth days of the incubation period or else five days after the rash had appeared in the original patient. Even if the attack was not prevented, it was always mild. Immunity lasted about three weeks when a further injection became necessary, if measles was still present in the family.

ORTHOPÆDIC SURGERY.

An Unclassified Form of Osteosclerosis.

PHILIP LEWIN and SIDNEY B. MACLEOD (*Journal of Bone and Joint Surgery*, October, 1925) report a case of osteosclerosis affecting the bones on the ulnar side of the forearm and hand and suggest a relationship of the condition to the distribution of the ulnar nerve. The changes in the bones are characterized by increased production of bone, sclerosis, eburnation, almost complete disappearance of the medulla, slight periosteal thickening and no atrophy or canalization and no invasion of the soft tissues. There is decreased deep sensibility to tuning fork tests of the bones involved.

Operative Repair of Cruciate Ligaments of the Knee.

A. H. EDWARDS (*The British Journal of Surgery*, January, 1926) describes an operation for the repair of the cruciate ligaments of the knee. The tendons of the *gracilis* and *semitendinosus* are used to replace the torn cruciate ligaments and are placed in the knee joint through an incision from the medial condyle of the femur. The tibia is drilled both from the medial and lateral sides to a point about the region of the tibial spine. Through the lateral canal the *semitendinosus* is drawn and the *gracilis* passed through the medial canal. These tendons are fixed when drawn as tightly as possible and the leg is treated on a splint in slight flexion. This operation has not been applied to the living subject. Among other advantages, according to the author, are the following: The lines of stress of the normal ligaments would be imitated as far as possible; the new ligaments remain attached to their muscles for the maintenance of nutrition and the range of movement is not impaired.

Torticollis.

K. HUTTER (*Wiener Medizinische Wochenschrift*, May 22, 1926) reviews fifty cases of torticollis observed at the Eiselsberg Klinik, Vienna. Five cases were rheumatic in origin and the patients were treated by medicinal measures. One was caused by an osseous growth in the cervical vertebræ. The remainder had been noticed either at birth or shortly afterwards. An obstetric history was obtained from twenty-five patients, ten had normal births, twelve were breech presentations and the mothers of three were delivered with forceps after prolonged labour. The right side was affected in twenty-six cases as compared with seventeen on the left. The usual operation performed was open division of the sterno-mastoid muscle close to the mastoid process. The head was then overcorrected and kept in position by a plaster of Paris bandage extending from the head to the shoulders. In two cases complete failure occurred, while four had some limitation of movement. In order to prevent facial assymetry the operation should be performed as early as possible. Keloid formation was noted in the operation scar of four patients.

Results of Periarterial Sympathectomy.

G. P. MULLER (*Surgical Clinics of North America*, December, 1925) has performed periarterial sympathectomy seventy times. Three patients suffering from Raynaud's disease were submitted to six operations. All patients were cured in the sense that no further gangrene has appeared. Eleven patients suffering from Buerger's disease were submitted to twelve operations. Most of them were improved as regards pain, but only temporarily; there were few permanent cures; no relief from cyanosis was obtained. A number of patients suffering from other conditions were also subjected to operation including ulcers, causalgia *et cetera*.

Compensatory Lengthening of the Femur in Children after Fracture.

W. H. COLE (*Annals of Surgery*, October, 1925) has observed twenty cases of fracture of the femur in children. Of these, fourteen manifested no shortening one year or more after fracture. Three had shortening varying between six millimetres (one-quarter of an inch) and eighteen millimetres (three-quarters of an inch), but these patients were seen only slightly more than a year from the date of injury. The lengthening may take place as late as two years after injury. The three remaining patients were observed for two years and still had from six millimetres to eighteen millimetres shortening. Two of these patients, both of whom were operated on because of delay in union and had internal fixation applied, had pronounced bowing in the femur. The alterations due to compensation in length may be found in the tibia as well as in the femur. On account of this compensation there is really no indication for operative reduction in fractures of the thigh in children.

An Operation for "Dangle Foot."

RUTHERFORD MORISON AND WILLIAM MACKENZIE (*Surgery, Gynecology and Obstetrics*, February, 1926) describe a new operation for "dangle foot." This consists essentially of making two bone grafts, one between the fibula and *os calcis*, the other between the tibia and *os calcis*. The grafts are obtained from the tibia. Three cases are described in which the operation was employed and in each case three years have elapsed since the operation was performed. The paper is illustrated with X ray pictures and photographs of patients. The results are said to be good.

The Cause of Perthes's Disease.

JOHN M. BERRY (*Journal of Bone and Joint Surgery*, April, 1926) says that a satisfactory explanation of the cause of Perthes's disease can be found in the theory of partially arrested development. A partial arrest of growth at the reptilian stage of development would result in an imperfectly formed, shallow acetabulum and small, malformed head of the femur. When rotation of the limb takes place in order to assume the erect attitude a dislocation of the head of the femur would be apt to occur. Lorenz is quoted as believing that congenital dislocation of the hip is due to arrested development. When the hip occupies the normal position the relatively poor quality of the epiphysis predisposes to the changes of Perthes's disease. This is particularly so when the hip is subjected to trauma. It has been shown experimentally that severe trauma of the hip joint affecting the circulation predisposes to changes similar to Perthes's disease. The author's speculations are supported by cases with congenital dislocation of the hip on one side and Perthes's disease on the other.

Spontaneous Fracture Following Bone Banding for Fractures.

C. C. GARR (*Journal of Bone and Joint Surgery*, April, 1926) reports two cases in which bone bands had been properly and neatly applied by a competent man and in which a spontaneous fracture due to muscular action alone occurred. In the author's opinion these bands should always be removed within a month, for, by that time simple fixation will be sufficient and the nutrition of the bone will not be seriously impaired.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on May 27, 1926, DR. R. J. MILLARD, C.M.G., the President, in the chair.

Intussusception.

DR. P. L. HIPSLEY read a paper entitled: "Treatment of Intussusception by Hydrostatic Pressure Based on an Analysis of One Hundred Cases so Treated" (see page 201).

DR. WILFRED VICKERS, D.S.O., read a paper entitled: "Diagnosis of Intussusception" (see page 206).

DR. C. P. B. CLUBBE said that both papers had been interesting, Dr. Hipsley's had been particularly illuminating. Since Owen had spoken against the use of hydrostatic pressure many years previously some practitioners had been lucky and had achieved success by this method. At every discussion on the subject various opinions had been expressed as to the advisability of injection. In later years Souttar at the West London Hospital had maintained that injections were not only useless, but also dangerous. Romani with the audacity of youth had declared that the time for injection was long since passed. Dr. Clubbe thought that Romani would be astonished when he read Dr. Hipsley's paper. Bolling in the *Annals of Surgery* (September, 1923) had stated that it was necessary to go to Australia to find a community where the early diagnosis of intussusception was the rule. He held that operation was the only form of treatment and that injection should be used only when no surgeon was available.

Dr. Clubbe went on to say that when he first began to operate thirty-three years previously it had been regarded as dangerous to open the abdomen. Many surgeons of good repute had regarded it as useless to operate on children. Dr. Clubbe's treatment of intussusception had been practically confined to injection in the first one hundred and forty cases. His cures had averaged 10%. It was evident, however, that he had not used it in the proper way. He did not persist as Dr. Hipsley did. He had used one or at the most two injections. In other words he had not adopted Dr. Hipsley's properly regulated hydrostatic pressure. It was curious how few cases of intussusception had been seen in the olden days. He had been at the Children's Hospital for nine years before seeing a case. The first patient with intussusception had been admitted in August, 1893. The following year the cases had numbered four, then five, then five again, then six and in 1900 seven cases. If the mortality from intussusception was to be kept low, it was essential that teachers should hammer home the necessity of immediate recognition of a case. If the condition were missed when a child was first seen, the child would probably be doomed. They should insist on early diagnosis and should realize its importance. If the onset of intussusception were missed and the child were not seen for, say, twelve hours, its chances of life would be enormously diminished.

DR. R. B. WADE said that they were all indebted to Dr. Vickers for his statistical facts and to Dr. Hipsley for enunciating what was almost a new method. In any case he had put an old method on a scientific basis. In regard to early diagnosis Dr. Wade emphasized the fact that a wrong conception of the disease was obtained from textbooks. The classical symptoms were always quoted, the sudden onset of vomiting, the passage of blood and the presence of a mass in the rectum. Intussusception should not be diagnosed from these symptoms alone. As a rule blood appeared in the stool about seven and a half hours after onset. If a diagnosis were made before the appearance of blood, cure would be certain. The presence of a mass in the rectum was not of diagnostic but of prognostic importance. Its appearance indicated that a child was moribund. In 80% the onset was typical, screaming occurred, then drawing up of the legs and pallor. The presence of these symptoms was sufficient for anyone to diagnose the possibility of intussusception. Once this was done the rest was easy. In a certain number the tumour could be palpated without the aid of an anæsthetic. If the tumour could not be felt, an anæsthetic should be given and the tumour would be discovered. The occurrence of blood in the stools was merely corroborative evidence.

There were several pitfalls in connexion with the diagnosis. One was the appearance of definite fæces after the onset. He recalled one case in which he had been called in consultation. He had been unable to arrive at the patient's house for about two hours. He had been told that the people were almost sorry that they had sent for him because the child had just passed a copious motion. Fortunately he had insisted on an anæsthetic being given. During its induction another large motion had been passed, but a large intussusception had been discovered in the transverse colon. There were several interesting points in regard to the passage of an intussusception through the bowel. Although the appearance of a mass in the rectum was of prognostic importance only, he had seen two cases in which this appearance had been rapid. In one instance the mass had appeared four hours after the onset and in the other after a slightly longer interval. In these two children the bowel had evidently been large, for in each the intussusception had been easily reduced. In regard to the question as to which forms of intussusception were easiest to reduce he thought that the most difficult were the ileo-colic form beginning in the ileum.

Dr. Wade said that he wished to congratulate Dr. Hipsley on his results. He confessed that he had abandoned the method altogether. In the olden days he had used injection by means of a Higginson's syringe. He had used three hundred or six hundred cubic centimetres (ten to twenty ounces) of fluid and not more. In this way a certain number had been reduced, but the majority had not been reduced. He would like to congratulate Dr. Hipsley on the care with which he had worked out the method. His was the master hand. He was skilled in palpation of the abdomen and could realize where the fluid was. He had also brought up the question of the recognition of thickening of the bowel by palpation after reduction of an intussusception. There were thus several fallacies for the man who only occasionally saw a patient with intussusception. It was hard to criticize any method of reduction and Dr. Hipsley's figures placed his method beyond argument. He thought it would be better to recommend practitioners generally to adopt the routine of opening the abdomen in order to satisfy themselves that reduction had been effected rather than to leave it to their untrained knowledge of palpation.

DR. HARVEY SUTTON, O.B.E., referred to the statistical side of the discussion. He apologized for speaking to the subject by saying that he had been three and a half years in England and during this time had studied at Great Ormond Street Hospital and children's work at the hospital in Oxford. He had no doubt that intussusception occurred more frequently in Australia than in England. He referred to the seasonal curve of intussusception shown by Dr. Vickers. The maximal differences were at six month intervals, London and Sydney both showing the chief incidence in the early summer. He thought that if a trained statistician were to study the graph he would probably be able to smooth out the curve and it might possibly be found that a hot season with its accompanying more frequent irritation in the bowel was a factor. He suggested that cases of spontaneous reduction should be included in the figures and the figures extended to obtain a larger comparison. It was hard to understand why baby boys were affected so much more frequently than little girls and why the disease was more frequently in breast fed babies. Apparently intussusception was the only danger which breast fed children had to fear. He thought that Dr. Hipsley had proved his case and that Dr. Vickers's paper was an extremely valuable contribution.

DR. HOWARD BULLOCK said that he had had some experience of intussusception at the Renwick Hospital for Infants. The work at this institution had been carried out according to the pattern of Dr. Clubbe's book. Medical

practitioners and the community generally were indebted to Dr. Clubbe not only for his work on intussusception, but for the founding of a hospital which was one of the finest in the world. He was greatly impressed by Dr. Hipsley's work and he thought that Dr. Hipsley was doing with hydrostatic pressure what Freyer had done with suprapubic prostatectomy. Freyer had resurrected suprapubic prostatectomy and it was now regarded by urological surgeons as the most suitable operation for removal of the prostate. Dr. Hipsley had made an impression on them all. Since reading Dr. Hipsley's first paper, Dr. Bullock had adopted the practice of washing out the bowel under pressure. In conclusion Dr. Bullock raised the question as to whether it might be advisable to train nurses in the method under discussion so that they might use it in the backblocks when doctors were not available.

DR. H. R. G. POATE said that he felt diffident in rising to take part in the discussion. He had not as much excuse as Dr. Bullock as he saw these cases only very occasionally. He thought that it must be very pleasing for Dr. Clubbe to see two of his old students following so faithfully in his footsteps. He thought that it might not be out of place if he gave them the impression of one who looked at these matters from the point of view of a general surgeon as well as of one who came into contact very freely with men in general practice. It would seem that the method of reduction of intussusception by hydrostatic pressure was ideal in such skilled hands as those of Dr. Hipsley. He feared what would happen if busy practitioners tried this method when they could not have easy access to an operating theatre. If the method became popular the mortality rate would go up. The hospital would get patients after an anæsthetic had been given and after hydrostatic pressure had been used. It should be impressed on practitioners that they should not adopt this practice unless adequate facilities were at hand for immediate operation. If Dr. Hipsley would qualify his teaching with this statement he would receive nothing but approval of his excellent method. Dr. Poate was at a loss to understand Dr. Hipsley's reference to the frequent prolapse of intestines into the bed after a midline incision. He had never seen this fatality. Another point in regard to Dr. Hipsley's method was the question of the anæsthetic. Dr. Hipsley had said that the anæsthetist frequently complained on account of the interference with the respiration resulting from distension of the abdomen. Dr. Hipsley was in the habit of working with highly skilled anæsthetists at the Royal Alexandra Hospital for Children. The man in the country would not be so fortunate and this fact would be a serious drawback to the general adoption of the method.

He had been very interested in the paper read by Dr. Vickers and he thought that closer study of the paper after publication (he hoped it would be published) would show that Dr. Vickers had covered the field in a sound and practical manner and that much valuable information would be disclosed.

DR. L. R. PARKER said that Dr. Poate had claimed but little excuse for speaking. He could claim less. Dr. Poate had seen a few cases of intussusception. He had not seen one. Although he felt he had no right to say anything, he wished to refer to the fact that intussusception was generally seen in healthy children. He was connected as most of those present knew with an institution known as "Greycliffe" where the little patients were never healthy and were not breast fed. "Greycliffe" had been in existence for fifteen years and they had an average annual population of three or four hundred. They had never had a case of intussusception among the inmates. It might possibly be said that perhaps cases had occurred without being diagnosed. Every watchful care, however, was taken and he thought it extremely improbable that a case had been missed. The reason why intussusception occurred only in breast fed infants had come to him at some of their *post mortem* examinations. The bowel of badly nourished children was thin; it had no body in it. Even the muscular coats produced a structure which was not thicker than brown paper. It had not sufficient body to allow kinking to occur or to allow one part to become intussuscepted into another. He did not know whether this had anything to do with the ætiology, but if it had nothing to do with the causation he did not know what the other factors might be. He did not think that the question of irritation of the bowel had anything to do with it; the bowel of children suffering from gastroenteritis and colitis was surely in a most irritable condition.

In conclusion Dr. Parker said that he would like to add his tribute in regard to the value of the papers which had been read. He thought that Dr. Hipsley's paper was excellent and had given them a new line of thought. In regard to Dr. Poate's warning he would like to say that although Dr. Hipsley had evidently proved his case, he (Dr. Parker) would not feel inclined to take on the management of hydrostatic pressure in the absence of a skilled operating surgeon.

DR. W. C. PETHERBRIDGE said that Dr. Hipsley had opened his eyes in regard to the reintroduction of an old method. He had supplied them with safeguards. He spoke as a general practitioner. It was not always possible to have either a hospital or a consultant at hand. Although there were certain dangers of causing perforation he thought that these must be very small. He asked Dr. Hipsley if palpation of the abdomen might not be a help if it were added to the use of hydrostatic pressure. He had recently reduced four cases of intussusception by means of palpation.

Dr. Hipsley in reply thanked those present for their criticism. In reply to Dr. Petherbridge he agreed that manipulation by palpation might be used to reduce intussusception. It was not advantageous to use it, however, for there was no indication as to whether the intussusception had been successfully reduced. In reply to Dr. Poate he said that he was not advocating the use of hydrostatic pressure for all and sundry. He always used it in a room adjoining the operating theatre and was ready to go on with the operation immediately if necessary. Full preparations were made for an operation and if he required to open the abdomen all that was necessary was to change his gloves and go ahead. If an attempt was going to be made to reduce intussusception by means of injection it should not be undertaken except by a surgeon who was capable of operating. He thought that when intussusception occurred in the country and not near a hospital the child would stand as good a chance of recovery if hydrostatic pressure were used as it would if it were subjected to operation by a man who had not held a scalpel in his hands before. In regard to the question of the intestines bursting through the abdominal wound and being found in the bed, he did not wish them to understand that he had seen a case of this. He thought that Dr. Clubbe would bear him out that in the early days such an occurrence was not so very uncommon. One surgeon had reported fifteen cases of this accident at one particular hospital. In his opinion the surgeon should have given up operating after his second or third experience. He thought that Dr. Bullock's suggestion in regard to the tuition of nurses was not advisable. In regard to the diagnosis he pointed out that the bowel sometimes acted after the formation of an intussusception. In one child intussusception had been present for seven days and complete obstruction had not occurred. He thought that this was the reason why yellow specks of fæces were occasionally seen in the returned fluid after the second or third injection, when the intussusception had failed to yield to hydrostatic pressure.

Dr. Vickers in reply thanked the speakers for their appreciation of his efforts. In reply to Dr. Sutton he said that he hoped to continue his investigations and would be only too glad to submit his figures to the scrutiny of a statistician. It was barely one month since he had been called upon to read the paper and he had embodied in his remarks as much of the statistical material as he had been able to collect during that period. He congratulated Dr. Hipsley on his results. He knew how Dr. Hipsley had persisted in the perfection of his method. It was excellent and other surgeons would find it more difficult to attain his standard than to become efficient operating surgeons.

He had not mentioned whether the children in his series had been breast fed or not. The records showed that 33% were breast fed and 5% artificially fed. In regard to the others no information was available. He thought that it was quite obvious that the large majority were breast fed. Dr. Parker's observations agreed with those of other authorities.

A MEETING OF THE SECTION OF SURGERY AND THE SECTION OF MEDICINE OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34 Elizabeth Street, Sydney, on April 28, 1926, MR. E. T. THRING, the Chairman of the Section of Surgery, in the chair.

Malignant Disease of the Stomach.

MR. H. B. DEVINE read a paper entitled: "Early Diagnosis of Gastric Cancer" (see page 209).

DR. S. A. SMITH thanked Dr. Devine for his instructive paper and was glad to hear that the speaker considered there was no short road to diagnosis. The most valuable part of the paper was the insistence on a close and careful history. He had been very interested in Dr. Devine's attempt to explain differences in symptoms, especially that of pain, according to the position in the stomach occupied by the new growth. He mentioned the occurrence of radiographic failures in diagnosis and said there was an unfair tendency in Sydney to rely on X ray examination for diagnosis in early cases.

He had an open mind concerning the value of Maclean's claim that the presence of lactic acid in the test meal was diagnostic; he considered that Maclean made few mistakes and that if his claim were true, it would be a long step forward. Dr. Devine's remarks on the incidence of carcinoma or ulcer were very striking. He agreed that there was very little clinical evidence to support the view that ulcer was a frequent cause of cancer.

DR. A. W. HOLMES À COURT said that it had been a privilege to hear Mr. Devine's admirable presentation of the subject of gastric carcinoma. He was entirely in accord with the speaker in emphasizing the importance of searching inquiry into the patient's own history of illness. Many mistakes in diagnosis undoubtedly arose from failure to appreciate this fact.

He instanced the case of an elderly man, suffering from indefinite gastric symptoms, who had been submitted to exhaustive examination by barium meals and other special methods without finality being reached. On reinvestigation of the history it had been found that the symptoms all dated from an acute respiratory infection. This had caused *empyema antri* and the digestive disturbance was of toxic origin.

With regard to the recent work of Professor Maclean to which Mr. Devine had referred, further experience would be necessary before it would be possible to assess correctly the value of the presence of lactic acid in the stomach as an early diagnostic sign. It should be remembered that structural change was relatively advanced when the radiographic picture was sufficiently definite to diagnose malignant disease.

Cooperation of physician and surgeon with careful summation of all the evidence, clinical, radiographic and chemical, offered the best prospect of early diagnosis. If this were done as a routine, malignant disease would become less likely to lurk undiagnosed, disguised as chronic dyspepsia.

In reference to the specimens exhibited, it was of interest to note that the type of growth which showed massive proliferation and tumour formation, appeared clinically to be frequently less malignant in nature than carcinomata in which growth tended to be more of an infiltrative type.

DR. H. R. SEAR apologized first for speaking at a surgical meeting in view of the fact that he was a radiographer and therefore not supposed to know anything about the clinical aspect of medicine. He had done over 10,000 opaque meal examinations and always took a careful history of the patient referred for an opaque meal examination, as such a history was undoubtedly a help to the radiographer. He had carefully dissected some eighteen months previously a large number of cases extending over a series of years. Analysis of his figures in a large number of carcinomata of the stomach showed that 40% were associated with vomiting, 7% with hæmatemesis and 7·5% with definite hunger pain. This series included cases of malignant disease of the cardiac end, *pars media* and *pars pylorica*, but did not include doubtful lesions at the pylorus, many of which he maintained in spite of Moynihan's statement were simple in nature. Dr. Sear pointed out that the type of pain was often very suggestive of the type of lesion found, for example, the history of leather bottle stomach was usually very typical. He suggested that pain in such a case might be due to rapid overloading of the small intestine. He agreed with Mr. Devine that malignant degeneration occurring in simple ulceration was very rare. He had seen such cases, but in his experience they formed an extremely small percentage of ordinary carcinomata occurring in the stomach. He had seen ulceration on the greater curvature of the stomach and also on the greater curvature border of the duodenum, though ulceration here was extremely rare.

He did not agree at all with Mr. Devine that an "intermittent" filling defect could be obtained from carcinoma on the posterior wall. He maintained that if a filling defect could be determined once, it could with care be demonstrated always. More mistakes were made with cancer of the cardiac end of the stomach than elsewhere and the percentage of such errors would be greatly decreased if the patient was submitted to X ray examination antero-posteriorly as well as postero-anteriorly in the horizontal position.

DR. HOWARD BULLOCK thanked Mr. Devine for his instructive address. Mr. Devine was an authority on gastric surgery and his conclusions should be accepted with respect. The examples of histories of varying clinical types shown on the screen all emphasized two definite and constant facts—loss of appetite and loss of weight. Three years' association with the late Professor Osler at Oxford in the wards of the Radcliffe Infirmary had made amongst others one lasting impression, namely, the demand to the surgeon to explore without delay all doubtful stomach conditions, particularly those in which medicinal treatment and dieting had given no relief within a few weeks at most. Mr. Devine allowed an incidence of cancer developing on ulcer of under 2%. Professor Stewart, of Leeds (*The Birtish Medical Journal*, November, 1925), on the other hand from an examination of over two hundred specimens from operations only had found that 9·5% of cases of chronic ulcer had become cancerous and that of the cases of carcinoma 17% had originated in chronic ulcer. Hurst (*ibidem*) also recognized the close association between chronic ulcer of the stomach and the incidence of carcinoma. Mr. Devine had laid stress on the value of a carefully compiled clinical history and pointed out the advantage of personal acquaintance with the sufferer. Dr. Bullock illustrated the lattter observation in the case of a man, aged fifty years, who had been an inmate of one of the large metropolitan hospitals of Sydney; test meals, opaque meal examinations and sigmoidoscopy had been carried out, in fact everything but laparotomy had been done and the patient had been discharged. Finally feeling that he was steadily "going down hill" he had consulted Dr. Bullock to whom it was obvious, having known him for many years, that something radical was wrong. He had been operated upon at Saint Vincent's private hospital without delay, three-fourths of the stomach had been removed for an adenocarcinoma of the lesser curvature (reported upon by the late Sydney Jamieson and for Dr. Arthur Palmer by the Board of Health). At the time of the meeting, four years after operation, he held a responsible public position and enjoyed the best of health. Dr. Bullock also quoted another case of a man, aged forty-five years, for whom, assisted by Dr. Athol Mobbs, he had performed partial gastrectomy in late 1915 at Saint Vincent's Hospital for adenocarcinoma of the pyloric end of the stomach (reported upon by Dr.

Walton Smith). The man was alive and well over ten years after operation, supporting Mr. Devine's contention that early diagnosis and radical operation achieved a small percentage of cures. It was his experience from having seen many cases that the great majority of patients came too late for radical operation. In conclusion, though Dr. Devine and other speakers had noted its appearance much earlier in life, he would like to lay stress on the importance of early operation in the cancer age, from forty years onwards, in patients manifesting gastric symptoms with loss of appetite and weight even in the absence of positive radiographic evidence.

MR H. R. G. POATE said that Mr. Devine was to be congratulated on the way he had presented his subject matter, thereby giving a comprehensive view of up-to-date methods of diagnosis, illustrated with actual cases from his clinical records. As one who had to take part in the teaching of students he was particularly struck with one of Mr. Devine's phrases, namely, "physiological dissection of the clinical evidence." It was hard for a student to understand why he was compelled to delve so deeply into normal physiology, but it was only from an accurate knowledge of the normal compared with a dissection of the pathological history that one was able to arrive at an understanding of the symptomatology and so at a diagnosis.

It seemed from Mr. Devine's remarks that the outstanding lesson to be learned was the necessity for acquiring the habit of physiological dissection and of training students along similar lines. The habit of investigation was one to be inculcated and fostered by all teachers in all subjects.

MR. B. T. EDYE said that the pathological specimens exhibited by Mr. Devine were all from advanced cases, a fact which emphasized the difficulties of early diagnosis in gastric carcinoma.

The size of the tumour did not necessarily determine its operability; for example, the papillomatous type might result in a large projecting mass which infiltrated the wall of the stomach but little, while the scirrhous type was characterized by a relatively small tumour and extensive infiltration. The term "cellularity" was probably intended to mean that the degree of malignancy depended not on the number, but rather on the character of the cancer cells; for instance, the smaller and less abundant cells of the mammary scirrhus were more malignant than the larger and more abundant cells of the encephaloid type of growth and the same general rule applied to gastric carcinoma.

With regard to the supervention of cancer on chronic ulcer he would say, after the microscopical examination of many ulcers, that this occurred in not more than 2% or 3% of cases. Broadly speaking chronic ulcers might be divided into three groups histologically, namely, the definitely malignant, the definitely simple and a doubtful group. It was in the examination of doubtful ulcers that even skilful pathologists might go astray and such ulcers had often been described as manifesting early malignant disease because of the sequestration by fibrous tissue of gland cells altered by chronic inflammatory changes.

DR. R. P. B. MONSON congratulated Mr. Devine on his excellent paper. He was surprised, however, at Mr. Devine's figures concerning the incidence of carcinoma on ulcer. Sherren, Moynihan, Pauchet and the Mayos all referred to the frequency of carcinoma supervening on ulcer as varying from 20% to 50%. Dr. Monson had seen all these men perform many operations and he was convinced that they were approximately right. On the other hand, the Scotch school went to the other extreme and said that it never occurred and while he was in Edinburgh, he had had to agree that they were right. He had worked with Stöerke in Vienna who had been collecting material for years and he was convinced that if examination were properly carried out by a competent pathologist many cases would be found in every clinic. He asked Mr. Devine whether he had had all his chronic gastric ulcers examined pathologically after removal and if so, what percentage of the large ulcers gave evidence of commencing malignant degeneration.

DR. ARCHIE ASPINALL said that he heartily agreed with Mr. Devine's insistence on the necessity for careful and accurate history taking. As many of those present were teachers in the clinical schools, the lesson should be taken to heart and more attention should be paid to history taking by medical students in the hospital wards. Of recent years owing to the large number of students this had not received the same attention as in former years. In patients presenting the early symptoms of malignant disease the cause at times was unrecognized long standing syphilis. He had also seen several cases in which a sudden severe hæmatemesis due to malignant disease of the stomach was the first indication to the patient that all was not well with him.

PROFESSOR F. P. SANDES asked Mr. Devine if he had observed patients with cancer of the stomach in whom the lesion seemed to run a long silent course and who finally went to pieces rapidly with fulminating symptoms. In his experience such cases were not rare. He pointed out the importance of keeping cancer of the stomach in mind in cases of obscure abdominal disease, as the suspicion of cancer might still remain after thorough investigation had revealed nothing definite.

He pointed out that statistics revealed that cancer of the alimentary tract was on the increase in Australia, while cancer in other parts was more or less stationary.

MR. E. T. THRING welcomed Mr. Devine's emphasis on thorough history taking. He considered that in the days when he was a student and house surgeon before the introduction of the examination of the stomach by X rays and biochemistry, histories had been taken with more care and understanding than they were at present.

In reply to Dr. S. A. Smith Mr. Devine said that he quite agreed that there was very little clinical evidence that carcinoma developed on ulcer. As a matter of fact in his experience he had only three cases which could be definitely said from the clinical evidence only to have developed on old ulcer. He quite agreed with Dr. Smith that a great deal of notice had to be taken of Professor Maclean's views on the value of the test meal, but there was no doubt that as the majority of the cases quoted in his table was from public hospitals, no doubt they were late cases, except in the few quoted as early cases and there was nothing to prove that the same consistent absence of hydrochloric acid was present in early cases.

In reply to Dr. Holmes à Court Mr. Devine said that the kind of growth present in the patient who lived for seven years after the operation, was a large carcinomatous ulcer on the greater curvature and a gland as large as a small walnut. He did not agree with Dr. Sear that it was practicable for the radiographer to take the history. The clinician's history and the test meal result and an account of the findings on clinical examination should be passed on to the radiographer. Very often the clinician would detect a resistance or a suspicious tumour which the radiographer might miss. Sickness, almost more than vomiting, was a feature in histories of gastric carcinoma. He thought that the umbilical pain which Dr. Sear suggested might be due to the quick emptying and distension into the intestine and its distension, was rather due to infiltration of the transverse mesocolon which caused a referred umbilical pain. He did not attempt to lay down any X ray rules for diagnosis of carcinoma of the stomach, but rather to point out that certain radiographic diagnoses were not fulfilled at the operation table and that deformation of the duodenum and prepyloric region from gall bladder adhesions and inflammation was one of these and that furthermore carcinomata in certain regions, such as the prepyloric region and the cardiac region in the vicinity of the bubble of air, were more frequently missed radiographically than lesions in any other situation in the stomach.

Some duodenal ulcers of the posterior wall were almost silent while others were not. He did not mean that every duodenal ulcer of the posterior wall was silent.

He quite enjoyed Dr. Sear's able criticism and thought that if the diagnosticians could get together with the radiographer over the difficult cases, they would help each other very much. He quite agreed with Mr. Poate that unless the surgeon or physician thoroughly understood

the physiological basis of the symptoms of gastric carcinoma, it was quite impossible to interpret or appreciate the earliest symptoms of carcinoma because it presented itself in so many phases.

In reply to Dr. Monson Mr. Devine said that the different views of the two schools on the question of whether carcinoma arose on old ulcer were due to the fact that one school studied from the histological point of view and that certain artifacts were likely to be mistaken for carcinoma, whereas the other school based their opinions on clinical evidence only.

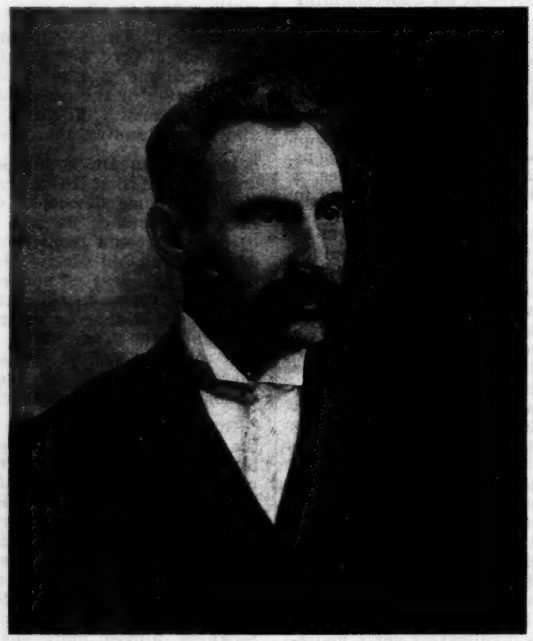
In reply to Dr. Aspinall he said that he had often seen hæmatemesis as a first symptom of carcinoma, but as a rule it was not an early symptom. Most hæmatemesis was not due to carcinoma.

In reply to Mr. Edye he said that he had shown the specimen of the large tumour of a stomach which had been successfully removed because he wished to controvert a statement that was freely made that when a tumour was present the condition was inoperable. The patient in this instance was alive four years afterwards.

He quite agreed with Mr. Edye that perhaps a tumour of this kind was often more operable than the infiltrative spreading type. He did not say that these carcinomata were more malignant, but that they gave rise to a certain type of history in which the toxic effects predominated and probably this was due to their cellularity.

Obituary.

JOHN FLYNN.



SIXTY-SEVEN years ago a boy was born in Tulla in County Clare, Ireland, some twenty miles north of Limerick. Lying latent, buried in the developing cells of the baby's brain, were intellectual qualities inherited from his father, qualities that distinguished him from others of his generation in after life. Years after John Flynn turned his attention to the mysterious phenomena of the handing down from father to son of dominant qualities of which no trace can be discerned during the early years of life. John Flynn enjoyed during his early youth the inestimable advantages of a beautiful environment in contact with a people noted for their happy disposition, for their delightful wit, for their eloquence and artistry and for the charm of their companionship. What more propitious a setting for the unfolding of a child's mind can be imagined. The influence remained with John Flynn throughout the whole of his life. It could be traced in his courteous manner, his gift of speech, his Irish charm, his true friendship, his pride of home and family, his unexampled honesty.

After having received a sound education at school, he entered the Royal University of Ireland and took the Arts as well as the medical course. His career as an undergraduate was a brilliant one. He obtained first class honours in his second examination in Arts in mathematics, mathematical physics and chemistry and second class honours in biology. He gained a prize in botany. In his second medical examination he took honours and gained an exhibition. In recent years he was stirred to the core when his sons repeated these achievements and gained honours and other distinctions in the medical course at the University of Sydney. He graduated in 1886 in medicine and surgery. His exceptional record opened for him the doors of all the hospitals in Dublin. He chose to become a house surgeon at the Mater Misericordiæ Hospital.

When twenty-nine years of age he set his face toward the other side of the world. Arriving in Victoria he practised at Bairnsdale. He was appointed honorary surgeon to the district hospital. He manifested from the first his concern for the welfare of every man, woman and child who entrusted him with the care of their lives. His own material benefit was a matter of indifference to John Flynn. He spared himself no pains to probe every illness to its depths, to unmask all the ætiological factors, to follow out the pathological changes and modifications of physiological processes to gain a mastery over the disease. The poor patient, the lodge member, the rich man were just human beings and required social and medical treatment and attention of the best kind. To all he gave the best. In 1892 he left Victoria and settled in Newtown in Sydney. Here he conducted a busy practice for some years, doing lodge work, surgery and general practice. Later he moved to 42, College Street. At a still later date he was appointed Honorary Surgeon at the Lewisham Hospital, where he carried out much excellent work. He was also a surgeon at Saint Vincent's Hospital. In 1908 he secured the position of demonstrator of anatomy at the University of Sydney. Teaching appealed to him and he spent a great deal of time and energy in connexion with this work. His studies led him to pay special attention to embryology and comparative morphology and he made full use of the opportunities afforded to him in the Department of Anatomy in prosecuting his investigations. He composed a thesis on the musculature of the heart and obtained the degree of doctor of medicine for this at the National University of Ireland in 1911. Heredity, especially in relation to structural qualities, occupied his attention in the year 1909 and the results of his studies were collected in an article which appeared in the *Australasian Medical Gazette* in 1910. He became a very regular attendant at the meetings of the New South Wales Branch of the British Medical Association. Reference to the past issues of this journal will reveal that he took part at very many meetings and that his contributions to the discussions were always based on a thorough and careful review of the recent literature on the subject. In 1914 he read a clever paper on the morphology and physiology of the caecum in which he explored the realm of comparative anatomy for guidance in the understanding of the problems. In November of the year 1915 he presented a paper on varicocele, at once learned, masterly and suggestive. About the same time he was attracted by a paper read at a meeting of the New South Wales Branch of the British Medical Association on test meals and took immense pains to ascertain the views of the many authorities on the physiological chemistry and physics of the secretions of the digestive tract. In 1921 he again revealed in discussion that he had followed the advance of physiological science in this subject and that no important detail had escaped him. His versatility may be gathered from the list of subjects on which he expressed

his opinions or of which he gave a clear summary of the most modern teaching. The list includes Friedreich's ataxia, fractures, acid-base equilibrium, the anatomy of the perineum, the physiology of the ductless glands, anoxæmia, the physiology of the secretion of the urine and the physiology of the gastro-intestinal tube among many other subjects. It is especially noteworthy that a medical practitioner whose daily work was that of a general practitioner later tending more and more toward surgery, should be so keenly interested in problems of so great a divergence. In 1917 he was appointed honorary instructor in operative surgery at the University of Sydney. Mention should be made of the fact that he was admitted in the year 1914 to the degree of bachelor of science at the National University of Ireland. The authorities recognized his erudition, the soundness of his knowledge, his industry and the extent of his scientific interests.

Those who knew John Flynn well, fell under the spell of his charming personality. His faults were in fact exaggerated virtues. He was overgenerous; he was almost too honest; he was the personification of kindness. John Flynn married a daughter of the late Richard Whitton. His family comprises six sons and three daughters. Of the sons four are medical practitioners, one is a second year student of medicine and the sixth may also follow his father's footsteps. The medical profession is much the poorer by the death of this unusually brilliant man; it will be long before he is forgotten.

FRANK SIRETT MATHWIN.

WE regret to announce the death of Dr. Frank Sirett Mathwin which occurred at Port Broughton, South Australia, on July 23, 1926.

JOHN POLLOCK.

WE announce with regret the death of Dr. John Pollock which occurred at Mentone, Victoria, on August 1, 1926.

JOSEPH PATRICK FRENGLEY.

WE regret to announce the death of Dr. Joseph Patrick Frengley which occurred at Wellington, New Zealand, on August 2, 1926. A graduate of the Royal University of Ireland in 1895, Dr. Frengley was for many years connected with the Department of Health of the Dominion of New Zealand.

Correspondence.

PERSISTENT OCCIPITO-POSTERIOR DELIVERY.

SIR: Dr. Gibson has placed your readers under an obligation by his publication of his occipito-posterior tables (see THE MEDICAL JOURNAL OF AUSTRALIA, June 26, 1926). If he would publish a similar record of two hundred consecutive, unselected hospital cases in more detail (such as adding columns for situation of head at end of the eighth month and early in labour, symptoms during pregnancy, labour and recovery and menstrual history), he would place us under yet further obligation.

However, an analysis of his present cases throws much light on the rôle of the uterine activities in persistent occipito-posterior deliveries, though we deal only with the duration of labour and the character of its termination.

Note the great variation in the length of the first stage.

Note that in a large proportion of cases, some primiparous, the second stage was very short and in about half, spontaneously delivered still persistent occipito-posterior. It is evident that the occipito-posterior presentation is not a real hindrance in a normal pelvis if the second stage is vigorous, even though it fail to rotate favourably and even in *primiparæ*. It is not a mechanical problem except where there is some inertia or probably where there is a slight pelvic contraction.

Note that a long first stage tends to be followed by a long second stage, and a short first stage by a short second stage, but by no means invariably. Indeed a study of Dr. Gibson's cases shows clearly that the two stages may vary independently of each other or in sequence and that the main error in delivery may fall in either stage or in both. It is as if the efficiency of the two stages depended on partially different factors. Case 91 is very remarkable, suggesting a transposition of the figures; if correct, it is an example of a strangely sluggish second stage following a very active first stage, a very rare experience. Her symptoms would be of great interest. Case 94 is also noteworthy as a tedious first stage and an average second stage led to a spontaneous delivery (persistent occipito-posterior). They show that symptoms need recording as well as the more objective data, if we are to hope to attain proper understanding of the functions of the uterus. In the long first stages the proportion of forceps is very high; in the short ones very low. Bad inertia of first stage is much more frequent than bad inertia of second stage, though there is a correlation between the two.

Note the great proportion of ill-health in the cases, suggesting a systemic cause behind the inefficiency of the uterus.

A consideration of the subjoined analyses of Dr. Gibson's figures makes it likely that the condition of the uterine muscle is of great importance in determining both the persistency and the delay in occipito-posterior presentations, even if obliquity of the uterus and anterior implantation of the placenta have more to do with determining their occurrence.

An analysis of occipito-anterior presentations shows similar findings; indeed most of my most troublesome cases have been occipito-anterior throughout; in some the delay in the second stage was due to a visceromotor reflex (that is a vaginismus); probably such a reflex was responsible in some of Dr. Gibson's cases also.

Analyses from Dr. Gibson's cases of occipito-posterior presentation:

A.—The first stage lasted 20 or more hours in 38 cases (28 spontaneous, 10 forceps).
The first stage lasted from 10 to 20 hours in 21 cases (14 spontaneous, 7 forceps).
The first stage lasted from 5 to 10 hours in 18 cases (14 spontaneous, 4 forceps).
The first stage lasted for 5 hours or less in 14 cases (14 spontaneous).
The first stage was of indefinite duration in nine cases (1 spontaneous, 6 forceps, one being fatal, one other interference, one not recorded).
The total was 100 (72 spontaneous and 27 forceps deliveries, one not recorded).

B.—In 100 cases, 41 were delivered persistent occipito-posterior, 35 spontaneously, five with forceps, one after other interference.

C.—In 100 cases there were 39 *primiparæ*, of whom 19 were spontaneously delivered (nine being persistent occipito-posterior), 18 with forceps, one after other interference and one not recorded. Among 61 *multiparæ* only nine needed forceps.

D.—The shortest first stage was 50 minutes (second stage 15 minutes, *multipara*, spontaneous).
The longest first stage was 75½ hours (second stage 4 hours 50 minutes, *primipara*, persistent occipito-presentation).
The longest first stage was 69½ hours (second stage 3 hours 30 minutes, *multipara*, occipito-anterior presentation).

The shortest second stage 8 minutes, after a first stage of 9 hours 25 minutes (*multipara*). Several were 15 minutes, one after a 46-hour first stage. The shortest primiparous second stage was one hour (first stage 27 hours, spontaneous, persistent occipito-posterior).

In 24 cases the second stage lasted less than one hour; of these 23 were delivered spontaneously.

The longest second stage 7 hours 10 minutes (Case 91). Of six others lasting over five hours five needed forceps.

Yours, etc.,

MARY C. DE GARIS.

Geelong, Victoria.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

INFORMATION has been received from the Executive Committee of the Australasian Medical Congress (British Medical Association) to the effect that owing to unavoidable circumstances the date of the holding of the second session will be postponed by one day. The session will commence on February 3 and terminate on February 10, 1927.

Books Received.

THE BACTERIOPHAGE AND ITS BEHAVIOUR, by F. D'Herelle, M.D., translated by George H. Smith, Ph.D.; 1926. Baltimore: The Williams and Wilkins Company. Demy 8vo., pp. 643. Price: $8·00.

AN ATLAS OF MIDWIFERY, by Comyns Berkeley, M.A., M.C., M.D., F.R.C.P., M.R.C.S., 1926. London: Baillière, Tindall and Cox. Demy 8vo., pp. 160, with 248 figures in the text and X ray supplement. Price: 7s. 6d.

THE DOCTOR'S BOOKS, by A. P. Bertwistle, M.B., Ch.B., F.R.C.S.E., 1926. London: John Bale, Sons and Danielsson, Limited. Royal 16mo., pp. 31. Price: 1s. 6d. net.

THE PEAKS OF MEDICAL HISTORY: AN OUTLINE OF THE EVOLUTION OF MEDICINE FOR THE USE OF MEDICAL STUDENTS AND PRACTITIONERS, by Charles L. Dana, A.M., M.D., LL.D.; 1926. New York: Paul B. Hoeber, Incorporated. Demy 8vo., pp. 105, illustrated with 40 full page plates and 16 illustrations in the text. Price: $3·00 net.

Medical Appointments.

Dr. Sydney Ernest Holder (B.M.A.) has been appointed a member of the Council of the Kadina Technical School, South Australia.

* * * *

Dr. Annie Mildred Mocatta (B.M.A.) has been appointed Honorary Pathologist at the "Mareeba" Babies' Hospital, Adelaide, South Australia.

* * * *

Dr. R. D. Bartram (B.M.A.) has been appointed Officer of Health to the District Council of Nairne, South Australia.

* * * *

Dr. Archibald Jenkins (B.M.A.) has been appointed Government Medical Officer at Redcliffe, Queensland.

* * * *

Dr. E. R. Dermer (B.M.A.) has been appointed Medical Officer of the Venereal Disease Clinic, Public Hospital, Fremantle, Western Australia.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xxii.

WESTERN AUSTRALIAN STATE PUBLIC SERVICE: Inspector-General of the Insane.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital. Cook District Hospital.
SOUTH AUSTRALIAN: Honorary Secretary, 13, North Terrace, Adelaide.	Contract Practice Appointments at Ceduna, Wudinna (Central Eyre's Peninsula), Murat Bay and other West Coast of South Australia Districts.
WESTERN AUSTRALIAN: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

AUG. 16.—New South Wales Branch, B.M.A.: Organization and Science Committee.
AUG. 17.—Tasmanian Branch, B.M.A.: Council.
AUG. 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
AUG. 18.—Western Australian Branch, B.M.A.: Branch.
AUG. 18.—Central Northern Medical Association, New South Wales.
AUG. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUG. 24.—Illawarra Suburbs Medical Association, New South Wales.
AUG. 25.—Victorian Branch, B.M.A.: Council.
AUG. 26.—New South Wales Branch, B.M.A.: Branch.
AUG. 26.—South Australian Branch, B.M.A.: Branch.
AUG. 27.—Queensland Branch, B.M.A.: Council.
SEPT. 1.—Victorian Branch, B.M.A.: Branch.
SEPT. 1.—Western Australian Branch, B.M.A.: Council.
SEPT. 2.—South Australian Branch, B.M.A.: Council.
SEPT. 3.—Queensland Branch, B.M.A.: Branch.
SEPT. 7.—Tasmanian Branch, B.M.A.: Council.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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